TEXAS
State Journal of Medicine

Owned, Published, and Issued Monthly

by

TEXAS MEDICAL ASSOCIATION

Edited for the Association Under the Direction of the Trustees

by

HARRIET CUNNINGHAM, Managing Editor

AUSTIN, TEXAS

Volume 55

January - December, 1959

PRESS OF

STAFFORD-LOWDON COMPANY

FORT WORTH, TEXAS

OFFICERS

OF

TEXAS MEDICAL ASSOCIATION

1958-1959		1959-1960
Dr. Howard O. Smith, Marlin	President	Dr. F. W. Yeager, Corpus Christi
Dr. F. W. Yeager, Corpus Christi	President-Elect	Dr. May Owen, Fort Worth
Dr. C. E. Willingham, Tyler	Vice-President	Dr. Barton E. Park, Dallas
Dr. J. M. Travis, Jacksonville	Secretary	Dr. J. M. Travis, Jacksonville
Mr. C. Lincoln Williston, Austin	Executive Secretary	Mr. C. Lincoln Williston, Austin
Dr. T. H. Thomason, Fort Worth	Treasurer	Dr. T. H. Thomason, Fort Worth
Dr. Charles P. Hardwicke, Austin	Speaker of the House of Delegates	Dr. Charles P. Hardwicke, Austin
Dr. James D. Murphy, Fort Worth	Vice-Speaker of the House of Delegates	Dr. James D. Murphy, Fort Worth
Dr. R. W. Kimbro, Cleburne	Board of Trustees	Dr. R. W. Kimbro, Cleburne
Dr. G. V. Brindley, Temple		Dr. G. V. Brindley, Temple
Dr. J. B. Copeland, San Antonio		Dr. J. B. Copeland, San Antonio
Dr. Troy A. Shafer, Harlingen		Dr. Troy A. Shafer, Harlingen
Dr. Byron P. York, Houston		Dr. Byron P. York, Houston

VOLUME 55 • NUMBER 1 • JANUARY, 1959

BOARD OF PUBLICATION

Robert W. Kimbro, M. D., Cleburne, Chairman
G. V. Brindley, M. D., Temple
Byron P. York, M. D., Houston
Troy A. Shafer, M. D., Harlingen
J. B. Copeland, M. D., San Antonio

•

Howard O. Smith, M. D., Marlin
President

•

EDITORIAL AND BUSINESS OFFICES

1801 North Lamar Blvd., Austin
Telephone: GReenwood 7-9447

C. Lincoln Williston, Executive Secretary
Harriet Cunningham, Managing Editor
E. Maxwell Jones, Business Manager
Jon R. Hornaday, Advertising Manager

•

PRINTING OFFICES

1114 West Daggett, Fort Worth 1

•

Subscriptions: $3 per year for members; $6 for nonmembers; $7 for foreign. Single copy: 75 cents.

Copyright 1959 by the Texas Medical Association. Owned and issued monthly by the Association.

Medical Etiquette

Most of the difficulties that arise today in the realm of medical etiquette—that is, relationships between doctors—could be avoided if physicians would realize that rules exist and will attempt to follow them.

Most of the sections in chapters IV, V, and VI of the 1955 edition of the Principles of Medical Ethics were considered to be in the domain of etiquette or manners. Since the condensation of the Principles of Medical Ethics into 10 broad basic principles in 1957, many physicians have not realized that these traditional concepts are still in effect; however, all are included.*

Though interpretation and mode of application may change with the variances of society, basic principles cannot change any more than the golden rule can change. For example, the rules concerning consultations were written before the days of modern specialization and are not altogether practical today, but the general principles still hold true: Consultations are to be conducted in the best interests of the patient; the physicians involved are to be considerate of each other; and the position of the family physician is to be respected.

Let us consider some of the common problems.

When a physician is to be out of town, he should arrange for another physician to care for his patients. His patients, and perhaps the hospital or telephone answering service, should be informed as to which physician is taking his calls. Incidentally, the courts have interpreted that a physician who leaves a seriously ill patient must leave that

*Principles of Medical Ethics; Opinions and Reports of Judicial Council, Special Edition, J.A.M.A., June 7, 1958.

patient under the care of a physician whose ability is at least equal to his own.

When one sees another doctor's patient because he is out of town, or not available in an emergency, it is his duty to return the case to the care of that physician as soon as he is available, and he should give him all information concerning findings and treatment. In caring for such a patient one must be cautious in changing the treatment and in commenting on anything the patient's own physician has previously said or done. When making a social call on the patient of another doctor, one should avoid, as much as possible, any discussion of the patient's illness.

Patients are often taken to a hospital in an emergency without the knowledge of the patient's own physician. The doctor in charge of the patient at the hospital should notify the family physician as soon as possible; and, if his physician is on the staff, he should be asked to take charge of the case. When several physicians are called in an emergency, the first to arrive on the scene is considered to be in charge of the case and should continue until the family physician can take over.

Today, patients frequently change family physicians. This should be discouraged, but one can take any patient who is not already under the care of another physician.

Before taking over the care of a patient who is being treated by another doctor, the patient or his family must notify the other physician that he is being relieved of the case. In these cases it is extremely important that one avoid any criticism of the previous physician. We must not cover up gross incompetence, but such complaints should be made to the medical society's board of censors, not to the patient or his family. Remember that things may not be exactly as they are described. Probably one of the most common mistakes made by young physicians is to criticize the methods of older physicians; however, no amount of scientific apparatus can replace the judgment and intuition that comes from years of experience in caring for the sick.

In regard to consultations, most problems arise from inadequate communication between the two physicians. When a patient is sent to a consultant, the referring physician should give the consultant the history of the case, his opinions of the case, his treatment, what he has told the patient and family, and the patient's ability to pay. He also should tell the consultant whether he wishes merely an opinion or both opinion and treatment.

In turn, the consultant should follow the request of the referring physician and should not treat the patient unless requested to do so. He should send a report to the referring physician, and he should see that the patient goes back to the referring physician. He should be cautious in discussing the things that the patient's doctor has said and done previously. A good consultant will never degrade the referring physician. In making a charge, the consultant should take into consideration the patient's ability to pay and the fact that the referring physician also will have a charge.

One of the more common evils arising from specialization is that patients frequently go to a specialist without being referred by their own physician. In certain conditions, this is justified, but occasionally it means that the "specialist" treats conditions outside his own field. I believe that if one designates himself as a specialist, he should confine his work to that specialty.

In regard to professional courtesy, physicians must not charge other physicians or their dependents; however, if there has been an expense involved because of travel or material used, the patient should offer to reimburse the physician for this expense. I think it is always in good taste to send some gift to show appreciation for services rendered. Concerning courtesy fees to members of paramedical professions and the ministry, each physician must follow the dictates of his own conscience.

If we will remember the dignity and the heritage of our profession, if we will place

service above self, and if we will place less importance on the almighty dollar, then we will not have need for codes of conduct. So far as I know, the golden rule has never been repealed.

—Robert Mayo Tenery, M.D., Waxahachie.

With April Comes House Cleaning

Time for cleaning house has begun for the Association, and come April members of the House of Delegates will be able to express their views on the work done by the Association's Reorganization Committee. Initiated by the 1958 House, review of the Association's organizational structure may not be completed by the time of the April annual session, but the portion which is will be submitted to the House for action so that the changes, if approved, can be put into effect as promptly as possible.

Rapid expansion within the past several years has resulted in a cumbersome organizational structure with a great deal of overlapping of responsibilities among the Association's 38 boards, councils, and committees. In an effort to streamline this structure and to minimize the load placed each year on the House, the basic change which the committee plans will consist of the placing of committees under the direction of a group of councils instead of having these committees be responsible to the House. Only the councils would report to the House, with each council chairman calling on the chairmen of the different committees under his supervision if elaboration on specific points becomes necessary.

Coordination of the whole picture, the committee reports, will provide for divisions by councils, standing committees, special committees, reference committees, and special appointees. The plan calls for Councils on Annual Session, Medical Jurisprudence, Public Relations and Public Service, Medical Education and Hospitals, Scientific Advancement, Medical Service and Insurance, and Constitution and By-Laws, with standing and special committees reporting to the particular council under whose jurisdiction each may be.

Reference Committees on Credentials, Reports of Officers and Committees, Resolutions and Miscellaneous Business, Finance, Scientific Work, Medical Service, and Constitution and By-Laws will consider and report on all such matters for which they are appointed. Special appointees will establish liaisons between the Association and allied organizations or will act as advisers to allied organizations.

The structure which is planned for the Council on Annual Session is typical of that which will be planned for each of the other councils. This one council will establish regulations for the guidance of the scientific sections and for the preparation, publication, and presentation of the scientific programs at the annual session. Under the Council's jurisdiction will be the Committee on Scientific Exhibits, which is the committee in charge of developing a scientific display for the session; the Committee on General Arrangements for the Annual Session, the committee which takes care of selecting suitable accommodations for the meeting; and the Committee on Memorial Services, which is the committee in charge of preparing and conducting the memorial services at the session.

Other details, such as size of councils and committees and tenures of office, are being worked out by members of the Reorganization Committee; but the final nod will come from the 1959 delegates.

The Right to Choose

The right of the patient to choose his own physician—this is a basic democratic principle which is being challenged today. Physicians are being called upon to defend this philosophy which has contributed immeasurably to America's scientific and medical achievements.

Third parties have become more and more involved in the business of providing medical

and hospital care in competition with the private practice of medicine. Many health and welfare programs have assumed responsibilities that formerly belonged to the individual. They have selected physicians and hospital facilities for their members without regard for the individual's own personal wishes. Physicians all over the country have become concerned over this situation, and the American Medical Association presently is staging a campaign to inform the public of the advantages of "free choice."

Although the medical profession has not opposed union, management, or lay sponsored health and welfare plans, it has been concerned over the way some of these plans have been operating.

Leaders of organized labor's medical programs recently met in Washington to consider "modernizing" certain patterns of medical practice—replacing "old fashioned" democratic principles such as free choice of physician and fee-for-service with more "up-to-date" methods of operation as closed panels and direct service programs. These labor leaders launched a nationwide campaign to educate union members on the advantages of giving up their right to choose their doctor. They feel that since unions pay the bills they have a right to pass on the quality of medical care provided their members.

Doctors are concerned with actual health plans which fall into three categories: union-sponsored plans, management-sponsored plans, and consumer-sponsored plans. While most of these offer good benefits to their patrons, the ones which limit the number of physicians participating are curtailing a right which is paramount in the practice of competent, thorough medical care. There are also the restricted panel plans which do not allow all the community's physicians in good standing to accept patients insured under the program.

Physicians are ready and willing to practice with third parties the same as without them. However, when certain plans insist upon drastic changes in medical practice that are detrimental to the patient, to the physician, to good medical care, and to the third party itself, then physicians must strongly object.

What, then, does the medical profession want to achieve in its relations with third parties? First, to be sure that the patient's needs are considered above all else; second, to seek as much freedom of action and as little intrusion as possible by the third party between doctor and patient; and finally, to maintain for the physician the right to judge the professional qualifications of doctors.

Men of medicine must understand clearly why free choice is good and then convince others of their point of view. Free choice to the physician means the challenge of the open market, the incentive of competitive selection, the chance to succeed or fail based on the judgments of many individual consumers, and the opportunity to develop a relationship with the patient undisturbed by outside forces of uncertain motivation. To the patient, it means the privilege of personal choice in an area affecting his life and health; it means the right to change physicians; it means control of the service by the one who receives and ultimately pays for the service.

Medicine's obligation is to recognize the self-policing responsibility that is a sine qua non of freedom. At the same time medicine must fortify the natural inclination of patients to preserve their right to choose. Lastly, medicine must attempt to persuade third party vendors of medical care, by astute negotiation, that this right should be protected.

Guest editorials and current editorial comments are solicited from members of the Texas Medical Association and others closely related to the medical profession of Texas. Topics should be of general interest and may pertain to scientific, organizational, socioeconomic, or philosophical subjects in the medical and health field. Manuscripts should be from 300 to 750 words in length.

★ Current Editorial Comment

Financing Medical Care For the Aged

Less than 20 years ago voluntary health insurance was relatively unknown to most Americans. Today, according to the Health Insurance Council, 123,000,000 people in the United States have some form of health insurance. In Texas alone 5,370,000 persons are estimated to be covered by some form of health insurance, 80 per cent of these being covered by insurance companies. These persons collected more than $148,000,000 in benefits during 1957.

This insurance is written in many forms and by various types of insurers. Each has its distinctive approach, providing the buyer the opportunity to choose the kind of plan best suited to his needs and ability to pay. It is necessary to recognize that many aspects of voluntary health insurance must still be looked upon as experimental and that this form of protection remains in a state of evolution. Hence, the keen competition which exists among insurers of all types has spurred experimentation to devise new and better benefits and approaches.

But what is being done to provide health insurance for our senior citizens? In the relatively few years since their special problems became of broad active concern, outstanding progress has been made in meeting their health insurance needs. The seven principal methods being employed are:

1. Continuation of insurance on older active workers under group insurance plans.

2. Continuation of group insurance on workers who retire and their dependents, generally with part or all of the premium paid by the employer.

3. Continuation on an individual policy basis of coverage originally provided by group insurance, this being accomplished by conversion of the group coverage on termination of membership in an insured group.

4. New issuance of insurance on groups of retired people such as retired teachers and civil servants and golden age clubs.

5. Continuation into the later years of individual insurance purchased at the younger ages.

6. Issuance of individual insurance that becomes paid up at age 65, but the coverage of which continues for the duration of life, thus enabling the policyholder to have lifetime protection but to pay for it during his productive years.

7. New issuance of individual insurance at advanced ages.

The number of older people having some form of health insurance today is not known precisely. Generally, it is accepted that at least 40 per cent of persons over 65 now have some health insurance coverage, although a recent study by the Michigan Medical Society indicated the insured proportion of the aged in that state to be 86 per cent. These proportions can be appreciated in truer perspective when it is recognized that the percentage of persons in the United States over age 70 having some form of health insurance protection in 1946 was exactly the same, 30 per cent, as the percentage of the entire population at all ages which had some form of health insurance protection in 1946, some 10 years earlier.

In any consideration of the subject of financing medical care for the aged, and the relationship of voluntary health insurance to it, several basic factors must be recognized.

1. It is not easy to segregate the specific problem of medical care of retired persons from the whole of the problems which face aged persons. These problems cover a wide spectrum of concern from maladjustment to retirement, to all the costs of personal living, to people maintained in general hospitals and mental institutions simply because there is no other place where they might be adequately housed.

2. Health insurance is not the only method of meeting the health costs of the aged. Many people age 65 or older are receiving, in addition to or independent of OASDI benefits, pensions from previous employment, income from investments, annuities, and income from individual and group life and health insurance policies. Many have accumulated savings, own their own homes free of mortgage, or have other assets. In addition, recent studies of the Social Security Administration show that an estimated 28 per cent of persons age 65 or older have income from employment.

3. The matter of financing the medical care needs of the aged, hence, constitutes a social problem only to the extent that they are indigent or might become indigent as a result of serious illness. Evidence is lacking that any American, aged or otherwise, who has needed and actually sought health care has been denied it. Traditionally the financing of care for this segment of the population has been either by public funds or private charity. The extent of this public responsibility becomes less as voluntary health insurance is extended to greater numbers of the population.

4. The existence of a financing facility, public or private, will not, in itself, guarantee that medical care will be received. Personal qualities ranging from mores to fears play an important role. So, too, does the degree of education. While this is true of the general population, it is particularly true of the aged, who characteristically are disinclined to alter habits or concepts of long standing. Sound health habits in

themselves are often difficult to inculcate in the later ages.

Great progress has been made in the past 5 years in developing a flexible basis by which voluntary health insurance can assist in financing the medical care costs of the aged; however, a fuller realization of the potential inherent in the various insuring mechanisms and a more adequate financing of medical care for the aged is dependent upon a coordination of several diversified efforts.

1. Voluntary health insurance needs more public understanding of its purposes, its nature, and what it is accomplishing. The entire corps of medical professional personnel, public health personnel, secondary schools, employers, labor unions, rural and farmers' organizations, community organizations, and others can help in an important way to create a better informed public.

2. More can be done to extend health insurance protection to the future aged. One fact is paramount today: the mechanism by which the future aged might be protected against the financial hazards of accident and illness does not exist; it remains only for it to be purchased to a greater degree.

However, insurance has to compete for the available dollar. From the standpoint of the individual who is not protected as a member of a group, choice must be made between health insurance and the many appealing consumer goods and services. He should be made acutely aware of the value for such protection. It must be made clear to him that he cannot seek protection for the childbearing period alone, discontinuing the insurance thereafter, and then expect to resume his coverage upon retirement.

With respect to the employer, health insurance has to compete not only with all the costs of production, including wages, but with other types of fringe benefits desired or demanded by employees. The problem of providing health insurance for the future retired is primarily one of financing. The employer cannot exceed his resources. Furthermore, he cannot provide so much in fringe benefits that he will be placed at a disadvantage with his competitors. The employer is also faced with the problem of the extent to which his productive employees are willing to share in the provision of benefits to the retired employees. In making his choice the employer, in turn, is often governed by the contracts arrived at through collective bargaining. These interrelated problems indicate the following in the interest of further protection for the future retired aged:

a. Employers and labor unions should be made increasingly aware of the primary importance of voluntary health insurance for their retired employees and of the need for financing such protection on a sound basis.

b. Employees, through their labor unions or otherwise, should be made equally aware of the importance of such protection in retirement and should give due weight to such importance in relation to their demands for other fringe benefits.

c. Active employees should be made aware of the importance of such future protection to the end that they will be willing to assist in bearing the costs for the protection of those who retire at an earlier date.

3. The problem can be relieved by the use of less expensive forms of medical care. Today, expensive forms of care for the aged are being employed for no other reason than that no others are available. It is now generally recognized that wider use of ambulatory or self-service hospital care, skilled nursing homes, the better use of practical nurses in or out of hospital, home care programs, visiting nurses, and specially conceived housing could serve to reduce appreciably the health care costs of the aged.

Insurers must stand ready, however, to cooperate in the development of newer forms of care and to include them in the insurance coverage. To do otherwise would be to create a retarding influence to such a development.

4. Steps should be taken to reduce to a minimum the number of future aged who would be needy. Educational and skill training programs to reduce the number of low income workers in the future can be one positive approach. Other approaches might be sought with respect to low income or marginal farmers and farm workers, migratory workers, and the designated geographic areas where, because of shifting industrial opportunity, many people find it impossible to earn subsistence wages.

5. The ultimate objective should be to insure that the years which have been added to life through the reduction in mortality shall not be spent in chronic invalidity. This calls for greater development of preventive health measures, the early detection and treatment of chronic disease, the creation or expansion of special facilities and services designed to meet the health problems of the aged, and the circulation of health educational information. There also is need of a great expansion in rehabilitation services and facilities.

Although voluntary health insurance alone cannot provide the solution to many of the basic problems inherent in financing medical care for the aged, it can play a salient role in bringing about the most efficacious use of medical facilities and personnel commensurate with quality care, allowing maximum freedom between the patient and the medical service and maximum opportunity for further progress in medical care.

—J. F. FOLLMANN, JR., New York.

♦ Mr. Follmann, Director of Information and Research, Health Insurance Association of America, 750 Third Avenue, New York 17.

President's Page

ON RAISING TREES

DR. SMITH

If raised upright from youth, in all probability a tree will remain upright after it reaches full bloom. If allowed to grow haphazardly, the odds for its satisfactory growth follow a dangerous margin. And if allowed to remain crooked when young, chances are great for its remaining the same as an adult. So it is with human beings—done early enough, a small push here, the right word there can produce amazing results. What appear to be inconsequential rules at the moment often can be key factors in producing individuals who are assets to our communities.

Rules for good health habits taught early can well be some of these key factors. And the teaching of these health habits often can erase from our statistics such facts as those produced by the Kraus-Prudden study, which showed 57.9 per cent of the American children failing the tests for muscular fitness as compared with 8.7 per cent of the European children who failed.

What better way to teach health habits than via our schools? The men and women who will be the presidents, directors, and business and professional leaders of our country "sooner than you think" are now in school. Working through the Abilene public school officials, the members of the Taylor-Jones Counties Medical Society are trying to obtain 100 per cent participation in the school system's physical education program. Beginning with a series of newspaper articles, the society is attempting to make its views known on the importance of physical training to the health of children.

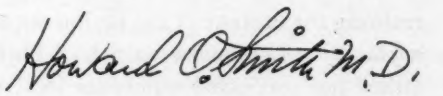
In 1955, the House of Delegates of the Texas Medical Association, realizing the urgency of improving our relationship with Texas schools, appointed a Committee on School-Physician Relationships. The committee has conducted numerous local conferences among physicians, school administrators, and school trustees; sponsored a statewide conference on physicians and schools in 1956 and a second one in 1958;

prepared a number of pamphlets on school health subjects; and planned a series of conferences on the county level between medical societies and coaches on sports injuries. One such conference was held by the El Paso County Medical Society in August of 1958. The El Paso conference program included a rather broad discussion on athletic equipment. The same type of program is planned for 1959, with perhaps additional discussions on such subjects as training room equipment and physiotherapy apparatus.

The El Paso committee for the care of athletic injuries, typical of what such committees throughout the state can do, is in charge of the appointment of the two team physicians for each high school in the community. The committee also acts in an advisory capacity to the local athletic council, the school superintendent, and the school board. In addition, the committee is responsible for seeing that each pupil participating in a major sport has a complete physical examination, either by the pupil's family doctor or by one of the team physicians.

Work of the state school-physician committee for 1959 will include participation in a coaching school scheduled in August. The school is the joint effort of the Texas High School Coaches Association, Texas Interscholastic League, Texas Society of Athletic Team Physicians, Southwest Trainers Association, and Texas Medical Association. Advice or criticisms on its past work or recommendations on future projects are welcomed by the Texas Medical Association committee.

When dealing with trees, tree experts are consulted; but when dealing with the health of humans, the mending experts are physicians. The examples cited have been but the work of few in an area where it is sorely needed—one good health habit taught correctly can avoid a lot of mending, and it is partly the job of the physician to see that this teaching is done.



ORIGINAL ARTICLES

Screening Tests Of Thyroid Function

Comparison of Tests Involving Serum Chemical Protein Bound Iodine And Thyroid Uptake Of Radioactive Iodine

LEONARD R. ROBBINS, M.D.

Houston, Texas

THYROID PHYSIOLOGY has received much attention in the 20 years since the discovery of radioactive iodine. The findings, reported in more than 8,000 scientific papers in the past 10 years alone, have led to clinical methods of measuring thyroid activity. It is the purpose of this paper to discuss these tests, emphasizing the two most useful: those involving serum chemical protein bound iodine and thyroid uptake of radioactive iodine.

Most cases of thyrotoxicosis and hypothyroidism are sufficiently obvious that laboratory tests are useful only to confirm the diagnosis and follow management. It has become apparent that certain obscure syndromes can be produced by thyroid functional derangement, such as tachycardia (paroxysmal or persistent), auricular fibrillation, weight loss, muscle weakness, obesity, infertility, menstrual disorders, habitual abortion, nervousness, heart failure not responding to digitalis, psychosis, abdominal pain, convulsions, and osteoporosis. People with similar symptoms often need to be screened for thyroid dysfunction. Moreover, since there are all gradations of thyroid abnormality, many patients are suspected clinically of thyroid dysfunction of mild degree. A trend toward routine examinations has developed in industry and business, and among the population at large, as a result of recognition of the importance of early diagnosis. Laboratory procedures, therefore, have taken on more importance, and screening procedures have been given wider application.

Physicians must be careful not to overemphasize the importance of the laboratory. The clinical impression and judgment of a well trained and alert physician is still the best diagnostic test, and the ultimate test may still be a trial of therapy. Some cases remain diagnostic problems; indeed, all available tests may not be sufficient to make a diagnosis. There are many parameters of thyroid function, and measuring one of these gives no more complete picture of thyroid function than does a single liver function or kidney function test indicate liver or kidney function, or an electrocardiogram tell the whole story about cardiac function. Moreover, the normal values of any test have a range of variation and overlap among high, normal, and low ranges. The bell shaped distribution curve of biologic data is well known, and thyroid function tests conform to this distribution. No test is more honest or reliable than the technician involved. In addition, it is subject to interpretation by a physician who must take these factors into account.

THYROID PHYSIOLOGY

An understanding of thyroid function tests is based on thyroid physiology which is schematically given in figure 1.

The normal dietary iodide intake is 125 micrograms daily with 115 micrograms excreted in the urine.[20] The normal thyroid concentrates about 75 micrograms daily, excreting the same amount as hormone.[20] Iodide is also made available by degradation

Dr. Leonard R. Robbins, clinical assistant professor of medicine, Baylor University College of Medicine; lecturer in medicine, University of Texas Postgraduate School of Medicine; and director of the isotope department, Levy Clinic, presented this paper in part for the Texas Society of Medical Technologists on April 26, 1958, in Houston.

With recently increased understanding of thyroid physiology have come useful tests to measure thyroid function. Protein bound iodine and radioactive iodine uptake tests are the most widely used screening procedures. Description of these tests, discussion of their usefulness, and comparison of their value in different situations are presented.

of thyroid hormone. Iodide is readily diffusible throughout the body fluids and cells; in fact, the blood cells contain 60 per cent as much inorganic iodide as does the plasma.[24] The thyroid competes with the kidney for this circulating iodide. In the presence of normal kidneys, the rate of kidney clearance is essentially constant (35 cc. per minute) and the variable is the avidity of the thyroid. In the presence of renal disease, however, the importance of the amount of iodide in the diet is increased, since, if it is generous and the renal excretion impaired, the blood level rises and the thyroid function tests are altered.[16]

The thyroid gland is able to trap iodide actively. The normal thyroid:serum iodide ratio is 50:1.[20] In the presence of thyrotoxicosis, thyroid stimulating hormone (TSH) stimulation or iodide deficiency, this may rise as high as 10,000:1. This trapping, facilitated by a transport enzyme, is blocked by perchlorate, thiocyanate, and nitrate and enhanced by iodide lack and TSH. Once within the gland the iodide is bound to protein. In the thyroid, 90 per cent of the iodine is bound—the rest inorganic.[20] The same ratio is true for serum.[24]

Thyroid stimulating hormone from the pituitary causes, within 2 hours, an increase in hormone release; in 8 hours there is an increased uptake of iodine.[20] A feedback mechanism is assumed, but direct evidence is limited.[20] The hypothalamic system is considered to have an over-all regulatory effect on the pituitary.

Within the thyroid, the synthesis of hormone proceeds with the bound iodide being converted by peroxidase to an "active" form. This reaction is blocked by the thioureas and related drugs and enhanced by TSH. The "active iodine" is then combined with tyrosine to form thyroxine. The exact intermediate steps, long considered to be monoiodotyrosine to diiodotyrosine to thyroxine, have recently been under considerable investigation, particularly regarding diiodothyronine and triiodothyronine.

The thyroxine (and triiodothyronine) formed are stored in the gland as thyroglobulin. This is a glycoprotein of an estimated 680,000 molecular weight. It is nondiffusible and is stored as colloid—no thyroglobulin is normally present in the plasma.[20] The active hormones are released into the plasma through the action of proteases. This reaction is blocked by iodides and enhanced by TSH. The known normal circulating thyroid hormones are thyroxine and triiodothyronine.

After release into the circulation, these hormones are loosely bound to a protein known as thyroxine binding globulin which is electrophoretically between alpha 1 and alpha 2 globulin. This plasma protein hormone complex makes the hormone available to the tissue cells. The cells then utilize the hormone in some manner not well understood in the process

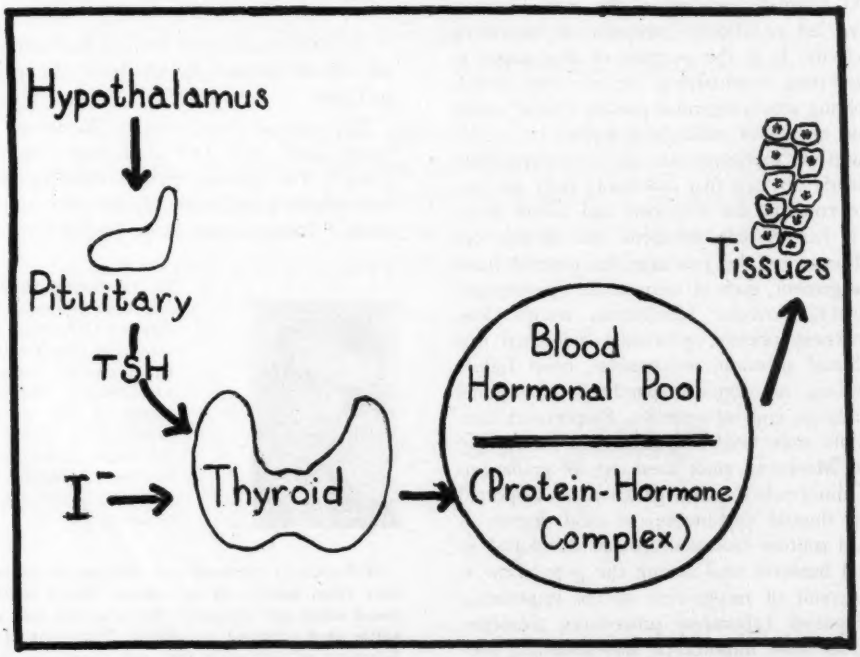


Fig. 1. Schematic drawing showing thyroid metabolism.

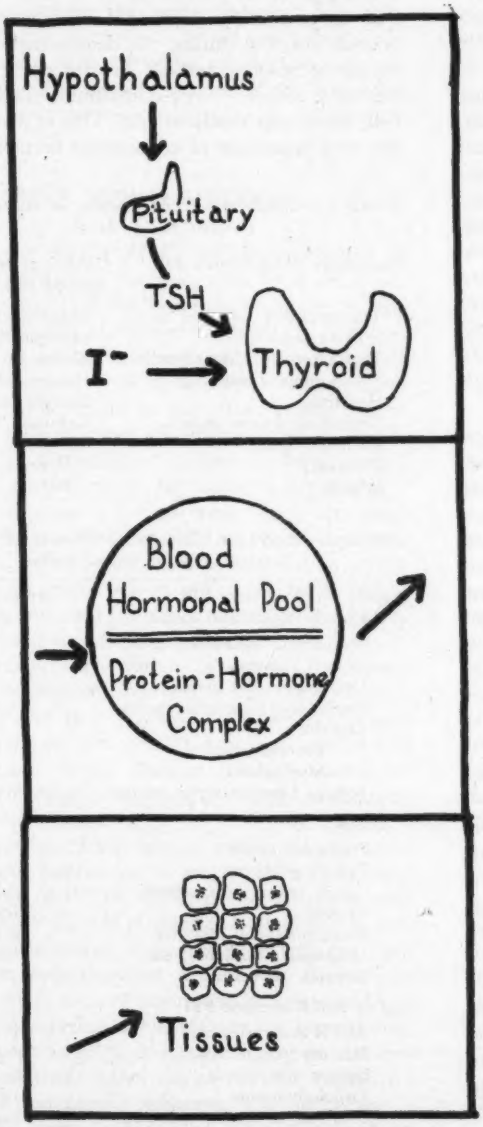
of their metabolism. There is in vivo and in vitro evidence that in the tissues, thyroxine may be degraded to triiodothyronine. Perhaps there are even further steps. Triiodothyronine may be more active because it is less well bound to the plasma protein.

The various available thyroid function tests and their place of application to thyroid physiology are shown in figure 2. The place of each disease in this picture will be demonstrated later.

PROTEIN BOUND IODINE

The chemical protein bound iodine (PBI) test is a measure of the circulating iodide in the blood, bound to protein, nearly all of which is hormonal. It is a sampling of the body hormonal pool which represents the circulating plasma protein hormone complex and is a balance between hormone production and utilization.

The technique of the PBI determination has been modified many times since first reported by Salter



FUNCTIONS

Iodine trapping
Iodine binding
Hormone synthesis
Hormone storage
Hormone release

TESTS

I^{131} uptake
Rate of uptake
Thyroid clearance
SCN discharge
Triiodothyronine depression
TSH stimulation
Effective half-life

FUNCTIONS

Circulation and binding of hormone
Size of pool
Rate of entry
Rate of exit

TESTS

Chemical PBI
PBI^{131} conversion ratio
Triiodothyronine or thyroxine injection

FUNCTIONS

Rate of utilization
Response to hormone
Type of utilization

TESTS

BMR
Cholesterol
Erythrocyte uptake of I^{131} l-triiodothyronine

Fig. 2. Available thyroid function tests and their place of application to thyroid physiology.

and others.[1, 19, 24] Prior to this time, only the total iodine was measured. The PBI is determined by distillation or alkali incineration methods.[20] The technique involves precipitation and washing of the serum proteins, digestion of the organic material, and conversion of iodide to an oxidized form. Distillation or extraction of the iodine is followed by colorimetric measurement of the iodine as iodide, after reduction, by its catalytic effect on the rate of conversion of ceric sulfate (yellow) to cerous sulfate (colorless). The quantities of iodine involved are minute, and great care must be taken in all phases of the determination to avoid losses or contamination with iodine.

Properly done, the PBI test is one of the most sensitive and accurate chemical tests known. Although it is probably the most diagnostic chemical test, it is such a microprocedure that its actual performance is extremely exacting. Meticulous care must be given by an experienced technician, temperamentally suited to such detailed work. It is desirable for the same technician to do the procedure every time. A special room is usually devoted to the procedure, even for the more modern "fully enclosed" techniques, because iodine substances, such as Gram's iodine solution, used in the same room may interfere with the result.

Extreme care is necessary in cleaning of glassware, syringes, and needles to remove any trace of iodine. This is particularly true if a contaminated specimen has been analyzed. In such an instance an entire batch may be contaminated. Good controls and blanks are necessary and best should be run at the beginning and end of each group of tests. All of these factors limit the number of tests which can be run properly on any given day by a single, albeit well trained technician. In addition, each laboratory must establish its own range of normal values, which may or may not correspond to that found by the person who developed the particular technique used. Techniques vary in different laboratories, and interpretation is necessary to understand the results reported.

The technical error involved in the method itself (that is, between duplicates) varies directly with the level of the PBI being analyzed. The usual estimate of the error is 5 per cent.[5, 9] Other estimates have ranged from 0.1 micrograms to 0.5 micrograms per 100 cc.[2] Note, however, that an error of 0.5 micrograms per 100 cc. with an average normal PBI of 6 micrograms per 100 cc. is 8 per cent. This error is not such, however, that the procedure cannot be very useful if this variation is kept in mind. There is a significant daily fluctuation in PBI in the same patient which is cyclic rather than random and more pronounced in the luteal phase in menstruating women.[11]

The PBI is elevated in certain conditions and decreased in other conditions[24] (table 1). Also, many drugs or chemical substances ingested or introduced into the body may affect the PBI. These with the approximate duration of their effect[12] are given in table 2. It should be noted that the rise of PBI associated with pregnancy occurs at no definite period and does not necessarily remain stable in any given patient.[22] The different effects of contrast media may depend on the amounts of iodine given; for example, a dose of intravenous cholografin containing 6 Gm. (6,000,000 micrograms) of iodine may be given in 5 minutes! It is little wonder the PBI is profoundly affected.[17] The mercury compounds interfere during the determination utilizing ashing techniques because of the precipitation of mercuric iodide.[20] Triiodothyronine depresses the PBI, sometimes nearly to zero. This is thought to be due to a depression of endogenous hormone produc-

TABLE 1.—*Conditions Which Elevate or Decrease Protein Bound Iodine Levels.*

Conditions which elevate PBI	Conditions which decrease PBI
Thyrotoxicosis (obvious or masked).	Hypothyroidism.
Thyroidectomy (immediately postoperatively).	Hypopituitarism.
Hepatitis.	Nephrosis.
Thyroiditis (acute phase).	Hypoproteinemia.
Radiation injury	Encephalitis.
Pregnancy.	Cushing's syndrome.
Infancy.	Senescence in males.
	? Stress.
	? Menses.

TABLE 2.—*Drugs or Chemical Substances Affecting the Level of Protein Bound Iodine.*

Agents which increase PBI	Approx. duration of effect
Roentgen-ray contrast media	
Iodipamide methylglucamine (Cholografin)	3-6 mo.
Oral gallbladder media	3 mo.
Intravenous urographic media	1-8 wk.
Lipiodol	
Bronchograms	>1 yr.
Myelograms	1-5 yr.
Soluble bronchographic media	few wk.
Drugs	
Potassium iodide	7-21 days
Lugol's solution	7-21 days
Cough syrups with iodides	7-21 days
Itrumil	few days
Vitamin-mineral mixtures	0-14 days
Diodoquin, chiniofon, etc.	few days
Thyroid, thyroxine	30 days
Agents which decrease PBI	
ACTH and cortisone	1 wk.
Mercury compounds	1-2 days
Barium compounds	0-3 days
Triiodothyronine	14 days
Overdose of antithyroid drugs	variable
Cobalt, para-aminosalicylic acid	variable
Testosterone	?

tion and a rapid clearing from the blood by the tissues of a very active hormonal substance.

An ancillary procedure is the butanol extractable iodine test (BEI), which may differentiate some artificially high PBI's since it is more specific for hormonal iodine. But, it is still affected by some extraneous materials. The usual normal values are about 1 microgram lower than the PBI. This test has not received widespread acceptance. It is performed by extracting the hormone from the patient's protein with butanol and then proceeding, as with the PBI, to measure the iodine content.

The PBI, if determined before and after TSH administration, may give some information concerning the amount of stored hormone in the gland and to some extent the reserve capacity of the gland.[27]

RADIOACTIVE IODINE UPTAKE

Radioactive iodine (I^{131}) was first reported in the study of thyroid physiology in 1938. It is not surprising that I^{131} has come to be useful in the clinical evaluation of thyroid problems. It is opportune that an isotope is so concentrated by the body in a single organ. It is to be hoped that corollary isotopes may be found so that other organs can be subjected to such close scrutiny.

A detailed discussion of nuclear physics is beyond the scope of this paper. Suffice it to say that I^{131} emits several strong gamma rays which are easily detected. In scintillation counting, these are converted to light by an activated sodium iodide crystal. The light is converted to electricity by a photomultiplier tube and amplified electronically before counting by a scaler or rate meter.

Laboratories vary, but it is possible to obtain accurate and reproducible results with simple equipment. For the past 4 years we have had in our office an isotope unit which has proven satisfactorily that one can obtain accurate results without the elaborate, expensive equipment found in hospital isotope departments.

The thyroid uptake test is performed by us as follows: The patient, on an empty stomach, is given a small dose of I^{131} of approximately 10 microcuries (containing 0.000008 microgram of iodine) in convenient capsule form. This dose previously has been counted in an appropriate phantom to ascertain its strength. In 6 and 24 hours the patient returns; a scintillation detector is placed over the thyroid area, and the percentage of the original dose in the thyroid is calculated after corrections for radioactive decay and extraneous radiation. The procedure is simple and entails virtually no patient cooperation. The patient notices no effects from the procedure, and the technique is reproducible so that it can be done easily by any intelligent person with brief training. Laboratory problems are minimal. If the counting room is distant from the area of isotope storage and handling, contamination is not a problem. It is simple to make equipment checks to verify the results, and positioning of the patient is easily learned. The variation among repeated uptakes in the same person is 2 to 5 per cent.

Actually the differentiation of disease states by this technique is rapid.[20] Six hour and 24 hour time intervals have been widely used for this procedure. As with the PBI test, techniques vary across the country. Recently, attempts to standardize this, under the supervision of Brucer, have been successful, and it is becoming more and more possible to compare results. Nonetheless, each unit must establish its own range of values and standard technique.

Most of the same extraneous substances affect the uptake of radioactive iodine as affect the PBI, but in the opposite direction; that is, administered gallbladder dye will raise the PBI but will lower the I^{131} uptake. The antithyroid drugs will inhibit uptake early, although the PBI will be slower to decline. (This is useful to ascertain the adequacy of therapy.) Tables 3 and 4 outline the conditions and drugs with their effect on uptake of radioactive iodine.

It is possible to get a profile of thyroid activity, utilizing multiple parameters of thyroid function, on the same dose of radioactive iodine given for the uptake, although a slightly larger dose would then be given. A number of such tests are listed here, but a detailed description is not germane to this paper:

TABLE 3.—*Conditions Causing Increases or Decreases in Uptake of Radioactive Iodine.*

Conditions causing increased uptake	Conditions causing decreased uptake
Thyrotoxicosis (obvious or masked)	Hypothyroidism
Pregnancy.	Hypopituitarism
Infancy	Thyroiditis
Renal insufficiency	Thyroidectomy
Severe chronic congestive heart failure	Radiation injury
Hepatic insufficiency	
Large nontoxic nodular goiter	

TABLE 4.—*Drugs Affecting Uptake of Radioactive Iodine.*

	Approx. duration of effect
Drugs which increase uptake	
Thiocyanate (only drug to increase uptake)	few days
Recent discontinuance of antithyroid drugs or thyroid hormone	variable
Drugs which decrease uptake	
Antithyroid drugs	7+ days
Butazolidine, para-aminosalicylic acid, ACTH, cortisone, sulfonamides	3-5 days

Thyroid scanning, differential counting, substernal counting.
Urinary excretion.
Conversion ratio 24 hours[25]; 72 hours.[18]
Effective half-life.[26]
Triiodothyronine depression.[6]
TSH stimulation ("reserve").[27]
Thyroid clearance.
Erythrocyte uptake of triiodothyronine.
Tests using radioactive iodine (I^{180}).[8]
Saliva test.[7]
Thyroid uptakes at other time intervals.[5]

COMPARISON OF TESTS

Although a battery of tests is sometimes necessary to clarify a given problem in thyroid diagnosis, there is need for a screening test to be used in routine clinical surveys. In such a test, in addition to accuracy, such factors as speed, simplicity, and ability to handle a large patient load become important. Judgment on the basis of accuracy alone is misleading, since applicability may be limited, for example, the fasting blood sugar and the glucose tolerance test in the diagnosis of diabetes mellitus. It is assumed that should the screening test be abnormal or if symptoms warrant, further studies would be in order. The older, purely empirical tests of thyroid function, the basal metabolic rate and serum cholesterol determinations, are beyond the scope of this discussion. Suffice it to say, their use is limited and adjunctive only.

The two most commonly used screening tests are the serum chemical PBI and the thyroid uptake of radioactive iodine. Neither of these gives a complete picture of thyroid function, but either is a good screening procedure. They may be compared by several criteria:

1. *Availability.* Both procedures are readily available in larger communities. In some local areas one may be more convenient. In rural areas, it is often simpler to send a blood specimen to the city than the patient.

2. *Cost to patient.* The cost varies from location to location. A few laboratories in the country offer mail order PBI determinations at low cost. I would view this with suspicion in the light of the admitted difficulty in performance of the procedure and the need for knowledge regarding the supervision of the procedure in the interpretation of the results. In this area, well run PBI tests are available for $15. The thyroid uptake of radioactive iodine, as usually performed, includes both 6 and 24 hour readings with a definite increase in information for $25. A single uptake test at either time interval can be done at the same price as the PBI—$15.

3. *Patient time and convenience.* The PBI test requires only the time necessary to draw a blood specimen and answer a few questions. The uptake procedure entails the same questions and the time necessary to swallow a capsule on the initial visit and a return visit lasting 5 minutes for readings. If 6 and 24 hour uptakes are both done, two return trips are necessary. Of course, the patient's time in getting to and from the laboratory will vary. It is my experience that most patients need to make two trips to the office, and it is customary to time the 24 hour reading so that other tests are being done also, avoiding the need for a special trip. Some patients object to blood-letting; the painless aspect of the uptake procedure thus may be important.

4. *Technician time.* The technician time in performing a PBI test varies, of course, with the number of tests done daily and the procedure used, but including cleaning of equipment, and so forth, each PBI represents an investment of 30 to 45 minutes of trained personnel time. A thyroid uptake test including both 6 and 24 hour readings entails only 12 to 15 minutes including standardization. Thus, in busy laboratories, a much larger patient load can be handled utilizing the uptake technique.

5. *Cost to laboratory.* The PBI test, necessitating more time, more expensive materials, higher paid personnel, the need for redoing contaminated runs, and a special work area, costs more per determination. The higher initial cost of isotope equipment partly offsets this temporarily, but in the long run the uptake procedure is less costly.

6. *Other applications.* The isotope equipment is useful in performing a number of other tests; the PBI equipment is useful for nothing else. An uptake test is necessary if radioactive iodine is to be given therapeutically.

7. *Availability of equipment.* Equipment for either test is readily available. It is my opinion that the standardization of the PBI test and ironing out of problems are much more time consuming than with the uptake. The uptake test, however, must be under the supervision of a physician authorized by the Atomic Energy Commission to receive and dispense isotopes. Such authorization requires special training which is available and brief, if only diagnostic studies are to be done. It is practical for a physician interested in isotopes to do many procedures in addition to the uptake and give therapy doses in an office—I have done so for 4 years.

8. *Accuracy.* If done properly the two tests should be about equally accurate, but there are a greater number of pitfalls with the PBI in inexperienced or careless hands.

9. *Usefulness in clinical states.* Some of the data from the literature are presented to give an idea of the relative results. One difficulty with such reports is that corresponding tests are not always on the same patient. In borderline cases, this may be crucial.

a. Separation of euthyroid from toxic patients. The PBI is generally reported to be 85 to 94 per cent accurate.[20, 23, 26] The I^{131} uptake has been reported as high as 98 per cent reliable.[20] The 6 hour test gives a good separation, often better than the 24 hour test. Zieve[28] expressed the belief that the uptake is the most effective test in this regard with the PBI four-fifths as effective and the basal metabolism test one-fifth as effective. My experience has been that the uptake is more useful for this purpose.

b. Separation of euthyroid from hypothyroid patients. The PBI is described as being 80 to 100 per cent accurate.[10, 23, 26] The I^{131} uptake is described as 93 to 100 per cent accurate.[10] It is generally accepted that the PBI is slightly more helpful here.

c. Differentiating borderline high cases. Schultz stated that the PBI is 86 per cent accurate while the uptake is 95 per cent accurate.[20] The PBI tends to be more proportional to the level of clinical toxicity than the uptake value. However, diagnostically, this may not be an advantage, and in a case of mild or early thyrotoxicosis with the PBI near normal, the radioactive iodine uptake may be high enough to give a decisive diagnosis.[10] I prefer the uptake in dealing with this type of problem.

d. Differentiating borderline low cases. The PBI may not be of value here if 4 micrograms per 100 cc. is the lower limit. In difficult cases a therapeutic trial is often the best test. One could have a drop in PBI from 6 to 4 micrograms per 100 cc. and still be in the normal range. The literature varies regarding the most applicable test.[21] In my hands, the PBI probably has the advantage in these cases.

e. Thyroiditis. The uptake is markedly decreased during the active phase of subacute thyroiditis, gradually increasing during recovery, with 3 to 6 months necessary to return to normal.[20] During the acute febrile stage, the basal metabolic rate and PBI are commonly increased, and a clinical differentiation between thyroiditis and thyrotoxicosis may be difficult. The finding of a very low uptake thus becomes very helpful. This low uptake does not increase after TSH administration. In chronic thyroiditis, if myxedema is absent, the tests are normal.[20] In Hashimoto's disease the uptake is variable (usually low normal).[15]

f. Thyroid cancer. Neither test is helpful since total function is rarely abnormal. Thyroid scanning or differential counting may be valuable.

g. Fictitious thyrotoxicosis. If this condition is caused by desiccated thyroid or thyroxine, the uptake is decreased and the PBI increased. If it is caused by triiodothyronine, both are decreased. Both tests are indicated.

h. Nontoxic goiter (nodular or not). The PBI is more likely to be normal. The uptake values may be borderline high but rarely significantly high.

i. Nonthyroidal hypermetabolism. Both tests are good; perhaps the PBI is better.

j. Euthyroid hypometabolism. Both tests are equally likely to show normal results.

k. Pregnancy. If a test is necessary, the PBI should be used. Even though the necessary dose of I^{131} is low, radiation should be avoided on general principles during pregnancy.

l. Infancy. Values are available in children for each test.[4, 14] The choice is an individual problem.

m. Goitrous cretins. A disassociation exists in these cases between trapping and synthesis. The uptake is high but the iodine may be discharged with thiocyanate. The PBI is low.

n. Summary in clinical states. The PBI and uptake are both good screening tests, useful in about 90 to 95 per cent of screening problems[24, 27] and so much more useful than the basal metabolism and cholesterol tests as to eliminate these procedures from routine use.[5] There are proponents of each test in the literature. It may be said that in my experience and that of others, if a generalization has to be made, the uptake is more helpful in differentiating euthyroid from toxic patients and the PBI is better at differentiating euthyroid from hypothyroid patients. The PBI is more reliable in the diagnosis of thyrotoxicosis in patients with nodular goiter.[10] The uptake is less subject to patient induced errors. In either test a distinctly abnormal level is abnormal, if obvious interfering factors are not present. The combined 6 hour and 24 hour uptake procedures (same dose) have definite advantages.

PBI values under 4 or over 8 micrograms per 100 cc. do not by definition indicate the existence of disordered thyroid function. Should such criteria be employed, many patients with normal function would be called abnormal, thus ignoring the overlap of values.

Conahey and others[10] reported an excellent analysis of comparative tests. In definite Graves' disease, the 6 hour uptake was 100 per cent accurate, whereas the 24 hour uptake was 88.9 per cent and the PBI was 96.1 per cent accurate. In difficult to diagnose Graves' disease, the 6 hour uptake was 100 per cent accurate, the 24 hour uptake 90 per cent and the PBI 89.5 per cent accurate. In patients suspected to have Graves' disease who turned out to be normal, the 6 hour uptake was 95.8 per cent correct, the 24 hour uptake 100 per cent and the PBI 94.5 per cent accurate. Patients with adenomatous goiter who were euthyroid were correctly recognized by the 6 hour uptake in 93.9 per cent and by the 24 hour uptake and PBI in 100 per cent. Patients who had adenomatous goiter but were toxic (the most difficult diagnostic group) were correctly diagnosed by the 6 hour uptake in 41.7 per cent, the 24 hour uptake in 22.2 per cent and the PBI in 87.8 per cent. Myxedema

was recognized in 100 per cent of the cases by the 6 hour uptake and PBI tests, while the 24 hour uptake permitted recognition in 92.3 per cent.

SUMMARY AND CONCLUSIONS

Our understanding of thyroid physiology has taken great recent strides. With this have come useful tests to measure thyroid function. There is no one test which is always diagnostic. The protein bound iodine and radioactive iodine uptake procedures are the most widely used as screening tests. Both are useful and convenient. A comparison has been made of their applicability. In difficult cases, a battery of tests must be done properly to evaluate the problem.

In the future, advances undoubtedly will be made in the techniques of both tests, and with better understanding of metabolic processes, newer approaches will be developed. I believe this most likely will come in studies of the plasma protein hormone complex and tissue utilization.

REFERENCES

A bibliography may be obtained from the author.

Dr. Robbins, 3618 Yoakum Blvd., Houston 6.

Health Insurance Increases Throughout Texas

More than 5,370,000 persons in Texas are protected by some form of insurance designed to help pay hospital and doctor bills, according to the Health Insurance Council.

This figure, the council says, is part of the continued growth of health insurance throughout the country, which was revealed in its twelfth annual survey of the extent of voluntary health insurance coverage for 1957. The number of people covered by some form of health insurance in the nation, according to a council estimate, is now 123,000,000 or 72 per cent of the total United States civilian population in contrast to 4,876,000 covered in 1956.

Education and Licensure Congress Set

The fifty-fifth annual Congress on Medical Education and Licensure will be held February 7-10 at the Palmer House in Chicago. The two major topics to be discussed will be "Specialism in Medicine" and "The Role of Research in the Education of all Physicians."

Sponsors of the congress are the Council on Medical Education and Hospitals of the American Medical Association, Advisory Board for Medical Specialties, and Federation of State Medical Boards of the United States. For further information those interested may write the American Medical Association, 535 North Dearborn Street, Chicago 10.

Certain Aspects Of Pneumonia

EDWIN M. ORY, M.D.;
ELLARD M. YOW, M.D.; and
OFELIA MONZON, M.D.

Houston, Texas

ALTHOUGH THERE has been a marked decrease in mortality rate due to pneumonia since the advent of the antibiotic era, there are still many problems related to the differential diagnosis, etiology, complications, and therapy of pneumonia.

There has been a decrease in the number of investigations concerning pneumonia since about 1948, except for studies related to the evaluation of new antibiotics and efforts to isolate causative viruses. Much progress has been made during the past decade with respect to the latter problem.

Considerable difference of opinion has been expressed by various clinicians on the changes in etiology and incidence of complications seen in pneumonia during the past few years.

The present report is based on a comprehensive study of pneumonia during the past 2 years at Jefferson Davis Hospital in Houston. The study is still in progress, but the analysis of cases presented here extends from September, 1956, through December, 1957.

DESCRIPTION OF STUDY

As many patients as possible were studied on the wards of Jefferson Davis Hospital. The house staff carried out the routine clinical care of the patients. They were urged to obtain sputum specimens and blood cultures for bacteriological study before initiating antibiotic therapy. The patients were followed closely in the wards by members of the Infectious Disease Service, and more detailed bacteriologic, serologic, and pulmonary function studies were carried out in selected cases whenever it appeared indicated and when the patients' condition permitted. Roentgenograms and other laboratory studies were obtained as they appeared to be indicated.

A Pneumonia Out Patient Clinic was established in order to obtain more careful and consistent follow-up on pneumonia patients after discharge from the hospital; and many patients for whom hospital beds were unavailable were treated and followed in this clinic. This included many of the milder cases of

pneumonia, and it was thought that a more accurate appraisal of the over-all incidence of pneumonia and its etiology could be made by including such patients.

Pneumococcal typing serum was available, and many sputum, blood, and spinal fluid cultures were typed with specific typing serums.

Electrophoretic studies were performed on many of the patients by Dr. Harold Dobson.

RESULTS

Etiology.—Table 1 shows an analysis of 222 cases as to etiology. Of this number, 89 cases were conclusively proven to be pneumococcal and 75 cases were found to be highly probable pneumococcal infections. Most of the latter group had positive Gram smears of the sputum and had a characteristic clinical picture and response to therapy; thus a total of 164 cases or 73.9 per cent were of pneumococcal etiology. Twenty-nine cases or 13.1 per cent were of unknown etiology. Many cases of bronchitis and viral respiratory infections were observed but not included in the study because they did not have definite evidence of pneumonia by roentgenographic or physical examination. Rales alone were not considered to be definite evidence of pneumonia unless accompanied by radiologic changes. Fourteen patients with pneumonia due to Gram negative bacillus infection were observed. These organisms included Klebsiella pneumoniae, Pseudomonas aeruginosa, Aerobacter, coliform bacilli, Proteus, and Hemophilus influenzae. This group exhibits a number of distinctive clinical, physiologic, and pathological features and will be the subject of a separate report.

Nine cases of psittacosis pneumonia were observed, and 2 patients with varicella pneumonia were included. Although some patients with primary atypical pneumonia may have been admitted during the period of study, none was proven by positive cold agglutination titers, which were obtained on a number of patients. It is probable that if other serological and viral studies had been available, additional cases of virus pneumonia may have been recognized.

It is of interest that only 1 case of primary staphylococcal pneumonia was observed in an adult during this period. There were 3 cases of secondary or superimposed staphylococcal pneumonia.

Thus the Pneumococcus continues to be responsible for the majority of cases of pneumonia.

TABLE 1.—*Etiology of 222 Cases of Pneumonia Studied.*

Type	No. Cases	Per Cent
Pneumococcal pneumonia (proved by culture)	89	40.1
Probable pneumococcal pneumonia (Not proved conclusively by culture)	75	33.8
Pneumonia of uncertain or undetermined etiology	29	13.1
Gram-negative bacillus pneumonia	14	6.3
Psittacosis	9	4.1
Varicella pneumonia	2	0.9
Staphylococcal pneumonia, primary	1	0.5
Staphylococcal pneumonia, secondary	3	1.4

Pneumococcal pneumonia, proven and probable, comprised 85 per cent of pneumonias of known etiology.

Bacteriologic Observations.—Table 2 shows an analysis of sputum cultures in 48 patients obtained before the administration of any antibiotic. It will be seen that Pneumococci were isolated as the predominant organism in 38 cases or 79.2 per cent, and this organism was present with other possible pathogenic organisms in an additional 3 cases. In 7 cases Pneumococci were not isolated.

TABLE 2.—*Pretreatment Sputum Cultures in 48 Patients.*

	No. Cases	Per Cent
Pneumococcus isolated as predominant or only pathogenic organism	38	79.2
Pneumococcus isolated, but other pathogenic organisms also present in large numbers	3	6.3
Pneumococci not isolated; other possible pathogenic bacteria present in small numbers	7	14.6

Table 3 shows the change in flora in 31 cases in which the initial culture was taken after the initiation of antibiotic therapy. In these cases Pneumococci could be isolated in only a third or less of the cases and many other organisms emerged as a prominent part of the flora. These include Neisseria catarrhalis, Klebsiella pneumoniae, alpha hemolytic streptococcus, hemolytic Staphylococcus aureus, Pseudomonas aeruginosa, Monilia, and H. influenzae, all of which are potentially pathogenic. These tables demonstrate

Dr. Edwin M. Ory and his coauthors presented this paper for the Section on Internal Medicine at the Texas Medical Association annual session April 22, 1958, in Houston. They submitted it from the Department of Medicine, Baylor University College of Medicine; Medical Service, Jefferson Davis Hospital; and Ben Taub Infectious Disease Laboratory, with the support of the Mading Foundation and Bristol Laboratories.

This report, based on 222 cases of pneumonia at Jefferson Davis Hospital, Houston, calls attention to differential diagnosis, etiology, complications, and therapy. Predisposing factors, superimposed infections, and the importance of establishing etiology are emphasized. The authors stress that although antibiotics have decreased mortality due to lobar pneumonia, many problems remain.

the profound effect of antibiotic therapy on the flora of the sputum.

TABLE 3.—*Patients in Whom Initial Culture Was Taken After Therapy Was Begun (31 Cases).*

Organism	No. Sputum Specimens Containing Organism in Significant Numbers.
Neisseria catarrhalis	15
Alpha hemolytic streptococcus	13
Pneumococcus	9
Hemolytic Staphylococcus aureus	8
Pseudomonas aeruginosa	6
Klebsiella pneumoniae	5
Monilia	4
Diphtheroids	4
Hemophilus influenzae	4
Beta hemolytic streptococcus	3
Escherichia coli	2
Aerobacter alkaligenes	1
Proteus	1

Table 4 summarizes 20 cases with positive blood cultures. Nine of the 20 patients died, giving a mortality of 45 per cent. The incidence of serious complications is also higher in this group.

TABLE 4.—*Pneumonia Patients With Bacteremia.*

Organism	No. Cases	No. Deaths	No. Recovered
Pneumococcus	17	7	10
Hem. Staph. aureus	1	0	1
Klebsiella pneumoniae	1	1	0
Pseudomonas aeruginosa	1	1	0
Total	20	9	11

Predisposing Causes.—Although pneumonia frequently occurs in otherwise normal and healthy persons, there are a large number of known predisposing causes that have an important effect on prognosis and the incidence of complications as well as contributing to recurrent attacks of pneumonia.

Table 5 outlines the most important and common ones; of these, by far the most common are the presence of a chronic or degenerative disease that in various ways impairs resistance to infection, especially to the Pneumococcus and certain Gram-negative bacilli. Malignancies and lymphomas are often associated with an immunologic disorder such as dysgammaglobulinemia, agammaglobulinemia, or hypogammaglobulinemia. These immunologic defects may be congenital or acquired, primary or secondary. Chronic pulmonary diseases are often associated with bronchial obstruction and impaired bronchial drainage with pooling of secretions that become infected.

Viral infections have been shown by other investigators to be an important antecedent event in bacterial pneumonia. Finland and others have shown that in some years up to 50 per cent or more of patients with pneumococcal pneumonia have shown serologic evidence of coexisting or antecedent influenzal infection. The majority of patients with pneumococcal pneumonia give a history of a common cold before the onset of pneumonia.

Occupation and avocation may play a role in making a given individual or group of individuals more susceptible to pneumonia. For example, we have observed an outbreak of psittacosis in two turkey processing plants. Hunters are more apt to be exposed to tick bites and animals infected with tularemia. Tularemia pneumonia was not observed in this series although it was suspected on a few occasions.

The occurrence of epidemics of influenza and often viral infections may influence the type, severity, and prevalence of pneumonia during a given year. Deaths have been reported during 1957 from influenza pneumonia although this series does not contain any proven cases of influenza pneumonia.

Anatomic disorders of the thorax and lungs, either congenital or resulting from acquired disease, may result in increased susceptibility to pneumonia.

Finally the influence of exposure and chilling is widely recognized.

TABLE 5.—*Predisposing Causes of Pneumonia.*

Chronic diseases.
- Alcoholism.
- Cirrhosis.
- Cardiovascular, especially congestive heart failure.
- Hematologic disorders.
  - Multiple myeloma.
  - Leukemia.
  - Sickle cell disease.
  - Anemia.
- Malignancies—all kinds.
  - Lymphomas, Hodgkin's disease.
  - Bronchogenic carcinoma.
- Chronic pulmonary disease.
  - Emphysema.
  - Bronchiectasis.

Immunological disorders.
- Agammaglobulinemia—congenital and acquired.
- Hypogammaglobulinemia.
- Dysgammaglobulinemia.
- Agranulocytosis.

Preceding viral respiratory infections.
- Common cold.
- Influenza.

Occupations and avocations.
- Exposure to psittacine birds.
- Hunters, meat handlers, etc.—tularemia, Pasteurella infections.

Epidemiology.
- Epidemics of influenza.

Anatomic disorders.
- Paralysis of intercostal muscles and diaphragm, especially following poliomyelitis.
- Kyphoscoliosis.

Exposure.
- Chilling and dampness.

Complications.—Complications of pneumonia were observed in 29 of the 222 cases. Eight of these occurred in patients with positive blood cultures. These are tabulated in table 6. Although complications occurred in 28 cases, the table lists 37 complications because some patients had more than one complication. The most common complication was the presence of a sterile pleural effusion in 6 cases which resulted in prolonging the hospital course. Empyema was observed in only 1 case. Congestive heart failure developed during the course of pneumonia in 5 cases, cardiac arrhythmia in 2, myocardial infarction occurred in 2 patients during the course of pneumonia. Superimposed infections occurred in 6 patients. Two of these occurred in patients who initially had pneumococcal pneumonia and subsequently developed a superimposed Gram-negative pneumonia and died. Three patients developed a superimposed staphylococcal pneumonia with delayed resolution.

We have observed a number of patients with pneumococcal meningitis, but only 2 are listed here as complications of pneumonia. One patient developed pneumococcal pericarditis and died as a result of the pericarditis rather than the pneumonia. One patient with Gram-negative pneumonia had multiple lung abscesses.

TABLE 6.—*Complications in Patients With Pneumonia.*

Complications	No. Cases
Superimposed infections	6
Sterile pleural effusion	6
Empyema	1
Otitis media	2
Meningitis	2
Delayed resolution	4
Pericarditis	1
Lung abscess	1
Massive atelectasis	1
Congestive heart failure	6
Cardiac arrhythmia	2
Myocardial infarction	2
Jaundice	1
Agammaglobulinemia	1
Hypogammaglobulinemia	1
Total complications occurring in 29 patients	37

Mortality.—Twenty patients in the group of 222 died, a mortality rate of 9 per cent. Table 7 summarizes the major causes of death in these 20 patients.

Physiological Changes.—Pulmonary function studies were done on representative cases of varied etiology by Dr. James K. Alexander. Clinical and physiological observations have indicated certain differences between patients with pneumococcal pneumonia and Gram-negative bacillary pneumonia. These studies will be the subject of a separate report.

In general the findings show that patients with pneumococcal lobar pneumonia demonstrated mild hypoxemia and a tendency toward respiratory alkalosis. Pulmonary blood flow was elevated, but pulmonary arterial blood pressures were normal. In contrast, patients with Gram-negative bacillary pneumonias developed severe hypoxemia and respiratory acidosis with extremely high arterial carbon dioxide pressure values in some instances. Residual volume was elevated with defective intrapulmonary gas mixing and spirographic "air trapping."

TABLE 7.—*Analysis of Deaths in Series of Pneumonia Cases.*

Gram-negative bacillary pneumonia		9
Pseudomonas	7	
Friedlander	1	
Others	1	
Pneumococcal meningitis		1
Pneumococcal pericarditis and empyema		1
Miscellaneous multiple complications		8
Congestive heart failure	2	
Myocardial infarction	2	
Cerebral vascular accidents	1	
Pulmonary embolism	1	
Diabetes	1	
Pyelonephritis	2	
Agammaglobulinemia	1	
Multiple lung abscesses	1	
Pneumococcal septicemia	1	
Varicella pneumonia		1
Total deaths		20

The findings indicate that the anoxia of pneumococcal pneumonia is due to failure to oxygenate blood perfusing exudate filled alveoli, whereas in Gram-negative bacillary pneumonia bronchiolar obstruction interfering with alveolar ventilation is the major physiologic change.

FAILURE TO RESPOND TO THERAPY

The majority of patients who have pneumococcal pneumonia respond promptly to antibiotic therapy. In patients who are otherwise healthy the incidence of complications and the mortality rate are very low. However, some patients in whom a clinical diagnosis of pneumonia is made initially do fail to respond to therapy as expected. Table 8 summarizes the most important reasons for failure to respond to treatment. High on the list is the institution of antibiotic therapy without first obtaining sputum and blood cultures. The diagnosis is then obscured, and when the patients fail to improve, it is often difficult to determine whether one is dealing with pneumococcal pneumonia initially followed by complications, or some other type of pneumonia from the beginning. Although pneumococcal pneumonia continues to be

the most prevalent type of bacterial pneumonia, other forms occur with sufficient frequency to emphasize the importance of obtaining initial cultures prior to starting antibiotic therapy. One of our patients with Friedlander pneumonia who died was treated for pneumococcal pneumonia before it was recognized that he had a Friedlander infection. It is possible that earlier recognition and more intensive antibiotic therapy could have been life saving.

Superinfection after an initial response to antibiotic therapy is becoming an increasing problem. This results in delayed resolution, and in some cases fatal superimposed infections occur. The most common responsible organisms are Staphylococcus aureus, Pseudomonas aeruginosa, Hemophilus influenzae, Klebsiella pneumoniae, Aerobacter aerogenes, Proteus vulgaris, various strains of Neisseria, and Monilia.

Patients who have a defect in host resistance are more likely to have complications and poor response to therapy. One of our patients with agammaglobulinemia had poliomyelitis with a residual partial respiratory paralysis. He had seven previous attacks of pneumonia and finally died during the eighth attack of pneumonia.

Many patients with pneumonia are dehydrated and have electrolyte deficiencies. Failure to recognize and treat these results in poor response to therapy, cardiac arrhythmias, diminished renal function, and sometimes death. Correction of these factors often results in dramatic improvement before antibiotic therapy has time to exert its effect.

In some patients with chronic illnesses, nutritional and vitamin deficiencies are important factors in poor response to therapy.

The clinician must be alert to the development of pyogenic or septic complications of pneumonia. These are much less frequent today than they were during the preantibiotic era. This diminished frequency is one reason for a decrease in the awareness of these complications. This series contains 1 patient with empyema who recovered and a second patient with both pneumococcal pericarditis and empyema who died.

Many patients have had an initial clinical diagnosis of pneumonia who have failed to exhibit the expected prompt response to antibiotic therapy. Subsequent observation and diagnostic study usually have revealed the presence of another underlying disease such as bronchogenic carcinoma, lung abscess, tuberculosis, fungus infections, virus infections, pulmonary infarction, or atelectasis. It should be emphasized that every patient with pneumonia should be followed carefully until complete roentgen-ray resolution has occurred even though the patient may be discharged from the hospital before complete clearing has occurred. However, roentgen-ray clearing may not be as prompt as temperature and other clinical response.

TABLE 8.—*Reasons for Failure to Respond to Therapy.*

Therapy without first establishing an etiologic diagnosis.
Superinfection with organisms resistant to antibiotics being administered, chiefly
Staphylococcus.
Pseudomonas aeruginosa.
Hemophilus influenzae.
Klebsiella pneumoniae.
Aerobacter aerogenes.
Proteus vulgaris.
Neisseria and Monilia—various strains.
Deficiency in host resistance, such as
Agammaglobulinemia.
Agranulocytosis.
Leukemia.
Lack of attention to fluid and electroylte balance.
Nutritional and vitamin deficiencies.
Development of pyogenic or septic complications.
Empyema.
Pericarditis.
Arthritis.
Meningitis.
Endocarditis.
Presence of another underlying disease.
Malignancy.
Lymphoma.
Lung abscess.
Tuberculosis.
Mycotic infections.
Virus infections.
Pulmonary infarction.
Atelectasis.

DIAGNOSTIC PROCEDURES

Table 9 summarizes the procedures of diagnostic value in pneumonia. Historical data furnish the most important single clue as to etiology. Physical examination confirms the presence of pneumonia and provides one with an estimate of the general condition of the patient. Sputum examinations including the gross appearance and microscopic inspection of a Gram stain provides almost immediate confirmation of the etiology in the majority of cases provided the patient has not received previous antibiotic therapy. Blood cultures are important because patients who have bacteremia have the highest incidence of complications and the highest mortality rate. When positive, the etiology is established beyond doubt. In some cases superimposed infections also will develop bacteremia with the superimposed organism. The blood leukocyte count and differential blood count is of limited value in differential diagnosis, but it provides some help in assessing the patient's response to infection and response to therapy. Patients with pneumococcal pneumonia who have a persistent leukocytosis may have an empyema

or other pyogenic complication. When leukocytosis is present, culture of other body fluids and exudates such as pleural, joint, and spinal fluids are of great importance in establishing etiology.

Serologic tests including cold agglutinins, streptococcus MG agglutinins, hemagglutination inhibition for influenza, and complement fixation tests for psittacosis and fungi may establish an etiologic diagnosis in selected cases with a suggestive history.

In patients who exhibit slow resolution, one may employ skin tests for fungi and tuberculosis to help elucidate the diagnosis. Occasionally patients may develop pneumonia or pneumonitis as a result of exposure to mercury or other heavy metals. Chemical analysis of the urine for heavy metals may help establish the diagnosis as occurred in 1 of our patients who inhaled mercury fumes.

Stool examination for ova and parasites may elucidate the diagnosis in patients with amebiasis, ascaris, and other parasitic diseases that may cause pneumonitis or pneumonia.

Lung puncture occasionally may be necessary in more protracted cases or when granulomatous diseases such as lipoid pneumonia are suspected.

Bronchoscopy may be helpful both therapeutically and diagnostically when one suspects an underlying bronchogenic carcinoma, atelactasis, or tuberculosis or when secretions are so profuse that they interfere with adequate ventilation.

TABLE 9.—*Diagnostic Procedures in Pneumonia of Differential Diagnostic Value.*

History.
Physical examination.
Sputum examination.
Gross and microscopic—Gram stain.
Culture.
Antibiotic sensitivities (selected cases only).
Leukocyte count and differential.
Blood culture.
Culture of other exudates.
Joint fluid.
Spinal fluid.
Pleural fluid.
Serologic tests.
Cold agglutinins.
Streptococcus MG agglutinins.
Hemagglutination inhibition for influenza.
Complement-fixation for psittacosis, histoplasmosis, coccidioidomycosis, blastomycosis.
Agglutination test for tularemia.
Skin tests.
Tularemia.
Fungi: histoplasmosis, coccidioidomycosis, blastomycosis, tuberculosis.
Heavy metal excretion for chemical pneumonitis.
Stool examination for parasites.
Lung puncture and lung biopsy.
Bronchoscopy in selected cases.

THERAPY

Treatment of the uncomplicated case of pneumonia is simple, and results are highly satisfactory. The Pneumococcus is invariably sensitive to penicillin, the sulfonamides, and almost always to the tetracyclines, erythromycin, chloramphenicol, and some of the newer antibiotics. Some of the newer antibiotics have not yet had sufficient clinical evaluation. Because of the extensively proven efficacy and economy of penicillin, we believe that penicillin by injection is the treatment of choice in pneumococcal pneumonia. Most patients in our series received a combination of penicillin and sulfisoxazole. We believe that in seriously ill patients it is important to administer aqueous penicillin rather than procaine penicillin for the first 24 to 72 hours since the former provides much higher blood levels than the latter. Therapy should be continued until the patient has been afebrile for at least 48 to 72 hours, shows clinical and preferably roentgen-ray evidence of resolution of the pneumonia, and has a leukocyte count of less than 10,000 per cubic millimeter. Tetracycline was administered to a significant number of patients in doses of 500 mg. every 12 hours, and the response seemed to be equivalent to that seen in association with penicillin therapy.*

Attention should be given to fluid and electrolyte balance, and in poorly nourished patients vitamins and nutritional supplements should be provided.

Oxygen should be administered if the patient is cyanotic, has multiple lobe involvement, tachycardia with pulse rate more than 110 per minute, arrhythmias, and other cardiac abnormalities, or if there is clouding of the sensorium or other mental aberration. In some patients, especially those with Gram negative bacillus pneumonia, copious bronchial secretions are a major problem and early tracheotomy is indicated. This is especially true if the patient does not show evidence of adequate oxygenation when placed in oxygen, if there is marked bronchial spasm associated with copious bronchial secretions, and if the patient is showing signs of inadequate pulmonary ventilation. The latter may be manifested by marked tachypnea, restlessness, delirium, tachycardia, and fine inspiratory and expiratory wheezes. Oxygen administered under positive pressure is also of value in these patients.

The presence of shock is a grave prognostic sign and demands prompt and early therapy. The administration of Levophed or Wyamine Sulfate is often effective. Shock may be associated with either pneumococcal or Gram-negative bacillus infections. Shock associated with the latter is more difficult and refractory to therapy.

**Tetrex brand of tetracycline phosphate complex was used and supplied through courtesy of Bristol Laboratories, Dr. Charles H. Mann, Medical Director.*

The administration of steroid hormones is still controversial. We have given them to most of the seriously ill patients and often have observed marked improvement in some cases; others have exhibited either temporary or no improvement. The exact role of steroid hormone therapy will have to await further evaluation although it can be stated fairly emphatically that it should not be given in the average case of pneumonia. Some cases with severe interstitial viral pneumonia have shown the most dramatic response.

Gamma globulin has been administered intramuscularly to a few of the extremely ill patients, all of whom have died. However, it was usually not given until the last 24 hours of life.

In general, antibiotic sensitivity studies are not necessary and are not helpful in pneumococcal pneumonia. If the disk method is used, it may even yield confusing and contradictory results. However, in pneumonia due to the Staphylococcus and the Gram-negative bacilli sensitivity studies are invaluable. They must be properly performed and carefully interpreted in order to yield worth-while information.

Antibiotics that are useful in Gram-negative infections are streptomycin, tetracycline, chloramphenicol, Polymyxin B, neomycin, kanamycin, and novobiocin.

Staphylococcal infections may yield to bacitracin, novobiocin, neomycin, ristocetin, kanamycin, erythromycin, vancomycin, and chloramphenicol and, when sensitive, to penicillin.

SUMMARY

Despite the decrease in mortality due to lobar pneumonia since the advent of the antibiotic era, there are still many problems related to differential diagnosis, etiology, complications, and therapy. Certain newly elucidated predisposing factors contribute to recurrent attacks of pneumonia. Superimposed infections are a serious problem. Pulmonary function studies indicate important differences in pneumonia of varied etiology. Successful therapy should be predicated on establishing the etiology.

REFERENCES

1. Alexander, J. K.; Leachman, R. D.; Ory, E. M.; and Yow, E. M.: Comparison of Physiological Alterations in Pneumonia Caused by Pneumococci and Gram-Negative Bacilli, abstract, Am. J. Med., 25:110 (July) 1958.

2. Jones, W. F., and Finland, M.: Susceptibility of Pneumococci to Eleven Antibiotics in Vitro, Am. J. M. Sc. 233:312-319 (March) 1957.

3. Kass, E. H.; Ingebar, S. H.; and Finland, M.: Effects of Adrenocorticotropic Hormone in Pneumonia: Clinical, Bacteriological and Serological Studies, Ann. Int. Med. 33:1081-1098 (Nov.) 1950.

4. Reimann, H. A.: Changing Nature of Pneumonia, Ann. Int. Med. 33:1246-1253 (Nov.) 1950.

5. Treatment of Clinical Pneumonia with Antibiotics [Aureomycin and Chloramphenicol]: Report by Sub-Committee of Antibiotics Clinical Trials (Non-Tuberculous) Committee of Medical Research Council, Brit. M. J. 2:1361-1365 (Dec. 8) 1951.

6. Weiss, W., and others: Klebsiella in Respiratory Disease, Ann. Int. Med. 45:1010-1026 (Dec.) 1956.

7. Yow, E. M.; Ory, E. M.; Leachman, R. D.; and Alexander, J. K.: Comparison of Clinical and Physiological Changes in Acute Pneumonias, to be published.

Drs. Ory, Yow, and Monzon, Department of Medicine, Baylor University College of Medicine, Houston.

Parenteral Iron Therapy for Iron Deficiency

R. K. BASS, M.D.;
E. R. HALDEN, M.D.; and
E. E. MUIRHEAD, M.D.

Dallas, Texas

IN RECENT YEARS reasonably safe parenteral iron preparations have been available for clinical use. During the past 2 years 103 patients with iron deficiency and anemia have been managed with parenteral iron in the Hematology Service of Parkland Memorial Hospital and its out-patient clinic. The results of this experience are considered in terms of the response to therapy, the main indications for parenteral iron as used by this service, the apparent causes for failure to respond to this form of therapy, and the safety of the procedure.

MATERIAL AND METHODS

Table 1 summarizes the main features of the patients given parenteral iron. There were 83 females and 20 males, 73 Negroes and 30 white patients. The ages varied between 15 and 87 years as distributed in table 1. The diagnosis of iron deficiency was based primarily on the clinical background of blood loss or the demonstration of blood via the stools or elsewhere plus the determination of a microcytic hypochromic anemia. In 81 cases the mean corpuscular volume (MCV) varied between 55 and 80 cubic microns (normal 87 ± 5) and in 91 cases the mean corpuscular hemoglobin concentration (MCHC) was 28 per cent or less (18-28 per cent, normal 32-36 per cent). The serum iron concentration

(SeFe) and the total iron binding capacity (TIBC) were determined in 22 cases. In these cases there was hypoferremia (SeFe 10-90 micrograms per 100 cc. of serum, average 44, normal 100-110) and a lowered per cent saturation of the iron binding (transport) globulin (per cent saturation 4-24 per cent, average 13, normal 30-40 per cent). A bone marrow preparation was obtained in each case usually by sternal puncture. The marrow units showed negligible or no hemosiderin (iron) deposits.[13] There was evidence for a slight to moderate erythroid hyperplasia (normoblastic) in most cases.

Dr. R. K. Bass and his coauthors are from the Departments of Medicine and Pathology, University of Texas Southwestern Medical School and Parkland Hospital. The paper was presented for the section on Internal Medicine at the Texas Medical Association annual session April 21, 1958, in Houston.

Parenteral iron therapy in 103 patients with iron deficiency and anemia proved satisfactory in 69. Overt complications (infection, uremia, carcinoma, and continued blood loss) appeared to prevent adequate response in 26. Complications from the therapy were not a major feature. It may be of value to liberalize the indication for such therapy.

The cause of blood loss was identified in 80 cases. As listed in table 1, 76 of these causes were distributed among gastrointestinal bleeding, menorrhagia, and closely spaced multiple pregnancies. A specific lesion was identified in only 20 of 34 cases of gastrointestinal bleeding.

The hemoglobin concentration was obtained by the alkaline hematin method[4] using a photocolorimeter which was calibrated periodically by the oxygen capacity method.[17] The red cell count was obtained in routine fashion with a hemacytometer. The hematocrit was determined by Wintrobe's method.[16] For this study a correction factor for trapped plasma was not used. The serum iron concentration was determined by the method of Barkan and Walker[1] using immediate and overnight acidification and the method of Kitzes, Elvehjem, and Schuette.[10] The unsaturated iron binding capacity (UIBC) was determined by the method of Rath and Finch[14] (TIBC=SeFe + UIBC). The red blood cell volume was determined by the radiochromium method,[15] and the venous hematocrit and the plasma volume was determined by the T-1824 method.[11] These two values were combined for the total blood volume. These various measurements were performed by the same personnel throughout the study.

The parenteral iron preparations used consisted of saccharated iron oxide given intravenously and a dextran iron preparation given intramuscularly. Three-fourths of the patients received the intravenous preparation in a total dose which varied between 0.5 and 3.0 Gm. (average 1.8 Gm., two-thirds between 1.5 and 2.5 Gm.). The course of treatment was usually distributed over 2 to 4 weeks. One-fourth of the patients received the intramuscular preparation in a total dose which varied between 0.5 and 2.5 Gm. (average 1.6 Gm., eight-ninths between 1 and 2 Gm.). The course of treatment again was distributed over 2 to 4 weeks.

Special precautions were taken in giving the saccharated iron oxide intravenously. Usually 100-200 mg. of iron were given by drawing back an equal volume of blood from the vein into the syringe and taking 3 to 4 minutes to inject the mixture. With the intramuscular material an attempt was made to place the material well within one of the gluteal muscles. Usually 200-400 mg. were injected per dose.

The results were gauged on the basis of improved well-being and the increment in peripheral hemoglobin concentration. The elevation in peripheral hemoglobin concentration has been expressed in

TABLE 1.—*Various Characteristics of Patients with Iron Deficiency and Anemia Treated with Parenterally Administered Iron.*

Age				Blood Loss		Hemoglobin		MCV		MCHC	
Years	No. Patients			Source	No. Patients	Gm./ 100 cc.	No. Patients	cubic microns	No. Patients	%	No. Patients
15-19	11	Sex		Gastrointestinal	34	3	6	55	7	18	2
20-29	23			Ulcer 4		4	8	60	7	20	3
30-39	21	Female	83	Cancer 5		5	7	65	13	22	6
40-49	11	Male	20	Hemorrhoids 8		6	29	70	18	24	17
50-59	12	Race		Other 3		7	23	75	20	26	29
60-69	9			Unknown 14		8	18	80	16	28	34
70-79	8	Negro	73	Menorrhagia	31	9	5	85	9	30	10
80-89	3	White	30	Pregnancies	11	10	3	90	5		
	—			Trauma	1	11	1	95+	5	Total	101
Total	98			Thrombocytopenia	2					Mean	27±2.6
				Other	1	Total	100	Total	101		
						Mean	7±1.6	Mean	76.7±7.5		
				Total	80						

grams per 100 cc. of blood per day. In computing this value usually a period of 14 to 30 days was used (average 18 days). In a few cases the blood volume and total hemoglobin mass in grams were computed before therapy and after a satisfactory response. This approach was used as a means of estimating the rate of hemoglobin generation.

RESULTS

Hemoglobin Concentration.—All patients showing a definite increment in the hemoglobin concentration expressed a sense of improved well-being. As has been often reported,[3, 9] the subjective improvement frequently occurred before the hemoglobin was substantially increased. Patients not developing definite increment in the hemoglobin concentration at times did not improve subjectively; however, in these cases, as discussed later, there were usually extenuating complications.

In table 2 the elevation in hemoglobin concentration is expressed in grams per 100 cc. of blood per day where an average of 18 days was used in the computation. Taking 101 of the cases into account the average elevation of the hemoglobin was 0.19 Gm. per 100 cc. per day. The spread was great (0.05 to 0.4 Gm. per 100 cc. per day) and the standard deviation was high (±0.14). This spread resulted from 31 cases showing an elevation in hemoglobin which was less than 0.1 Gm. per 100 cc. per day or from no change to negligible change. The usual rate of elevation of hemoglobin for parenteral iron as given in the literature is between 0.1 and 0.3 Gm. per 100 cc. per day.[9] When the 31 cases which failed to develop the expected elevation in hemoglobin (0.1 Gm. per 100 cc. per day or more) were excluded from consideration, the average elevation in hemoglobin became 0.275 Gm. per 100 cc. of blood per day and the standard deviation was lowered to ±0.09 Gm. per 100 cc. per day. As discussed hereafter, most cases which failed to respond by an increment of 0.1 Gm. per 100 cc. per day or more gave evidence for a concomitant complication which likely prevented the proper response.

TABLE 2.—*Tabulations Indicating the Response to Parenteral Iron Therapy as Measured by the Rate of Elevation of Hemoglobin Concentration and a Listing of the Frequency of Complications Which Appeared to Preclude an Appropriate Response.*

Hemoglobin Response Gm./100 cc. of Blood/Day	No.	Complications Apparently Preventing Hemoglobin Response	No.
<0.05	29	Infection	6
0.05	2	Azotemia	6
0.1	9	Continued bleeding	7
0.15	6	Carcinoma	5
0.2	19	Other	2
0.25	8	Unknown	5
0.3	11		
0.35	8	Total	31
0.4+	9		
Total	101		
Mean all cases=0.19±0.14			
Mean 0.1+=0.275±0.09			

Failure to Respond.—Thirty-one cases failed to develop an increment in hemoglobin concentration of at least 0.1 Gm. per 100 cc. per day. Of this group 19 developed no response, and for 3 the response was negligible. Twenty-six of these 31 cases had an obvious complication which could be considered inimical to a proper response. As indicated in table 2, 6 patients had overt infection such as pulmonary suppuration and pelvic inflammatory disease, 6 had renal insufficiency as indicated by azotemia and other findings and 3 of these had active pyelonephritis (infection), 5 had advanced carcinoma, and 7 gave distinct indication of continued and overt bleeding usually through the intestinal tract. Two patients had active inflammatory disease (rheumatoid arthritis and widespread granuloma of unknown etiology). Only 5 cases yielded no obvious complication which might have vitiated a response. Thus it appeared that infection, uremia, carcinomatosis, and continued blood loss represented the main complications associated with failure to respond to parenteral iron.

Age and Response.—As shown in table 3, there appeared to be no relationship between the age of the patient with iron deficiency and rate of rise of hemoglobin concentration. Certain of the more pronounced responses were encountered in patients between the ages of 50 and 87 so long as complications of the type previously discussed were not present.

Rate of Generation of Hemoglobin Mass.—An appraisal of the rate of generation of the hemoglobin mass may be obtained by determining the blood volume and hemoglobin mass before the treatment and after a substantial response in the peripheral hemoglobin. For this purpose the radiochromium

TABLE 3.—*Relation of Age to Response to Parenteral Iron.*

	Hemoglobin Response Gm./100 cc. of Blood/Day			
Ages (yr.)	0.1+	0.2+	0.3+	Total
15-19	3	1	5	9
20-39	6	15	12	33
40-69	4	8	6	18
70-87	1	1	4	6

method and venous hematocrit were used for the red cell volume and the T-1824 method was used for the plasma volume. These data obtained from 1 case in this series are given in table 4. In this case 40 mg. of iron was used effectively by the bone marrow per day for hemoglobin production. In a series of 13 adult patients with hypochromic anemia this approach indicated an average utilization of parenteral iron for hemoglobin production per day of 47 mg. or an amount equivalent to 14 Gm. of hemoglobin.[2]

Estimation of Dose.—It is usually considered that the circulating hemoglobin of the average adult contains about 2.5 Gm. of iron (blood volume 5,000 cc.; blood iron 50 mg. per 100 cc.; 50 times 50 = 2,500 mg.). The iron stores contain approximately 1.0 Gm. of iron.[6] Multiplying 2.5 by the hemoglobin expressed as per cent gives an estimate of the iron deficiency in the circulating blood,[8] and adding 1 Gm. to this gives the total estimated deficiency. The average hemoglobin concentration at the start in the present cases was 7 Gm. per 100 cc. or about 50 per cent deficit in iron or about 1,200 mg. of iron (0.5 times 2,500 mg.). The average dose of iron given to these patients was near 2 Gm.

Special Cases.—Two special cases are presented. These cases exemplify the interference of continued blood loss with the rate of elevation of the hemoglobin concentration.

CASE 1.—A 36 year old Negro woman had a microcytic hypochromic anemia (hemoglobin 7.6 Gm. per 100 cc., MCV 62 cubic microns, MCHC 24 per cent). The anemia was attributed to menorrhagia. The history and record indicated an anemia of several years' duration and no response to several courses of oral iron therapy. The patient was placed on oral iron once more (dose 0.3 Gm. 3 times daily, after meals). The indications were that the patient was cooperative in carrying out this regimen. After 2.5 months on oral iron there was no improvement. At this time she was given a course of parenteral iron consisting of 1,200 mg. of iron as saccharated iron oxide given intravenously in divided doses over 90 days. The hemoglobin rose from 5.4 Gm. per 100 cc. to 9.7 Gm. despite continued menorrhagia. According to the record, this was the highest hemoglobin value in 10 years. The patient's hemoglobin was type A by paper electrophoresis, there was no sickling, the erythrocytic osmotic fragility was normal. The bone marrow showed erythroid hyperplasia and no hemosiderin deposits. Many tests on the stool for occult blood were negative. With discontinuance of parenteral iron the anemia and hypochromia recurred.

The sequence of response to parenteral iron followed by recurrence was repeated on four occasions. Two years following the first course of parenteral iron a hysterectomy was performed and leiomyomas were found. Prior to the operation the hemoglobin was 6.6 Gm. per 100 cc., the MCV 60 cubic microns, and the MCHC 22.4 per cent. At this time the serum iron concentration was 40 micrograms per 100 cc., the total iron binding capacity was 305 micrograms per 100 cc. of serum (13 per cent saturation). The patient received 2.5 Gm. of iron as saccharated iron oxide intravenously over 84 days. Two months later the hemoglobin was 14.5 Gm. per 100 cc., the MCV 89 cubic microns, and the MCHC 34 per cent. The anemia has not recurred.

CASE 2.—A 62 year old white woman complained of a long standing and incapacitating anemia. The anemia had been detected for 13 years. Oral iron therapy had been ineffectual. A diaphragmatic hernia which was previously identified was confirmed. Abdominal discomfort particularly following meals was related. A severe microcytic hypochromic anemia was identified (hemoglobin 5 Gm. per 100 cc., MCV 68 cubic microns, MCHC 24 per cent, serum iron 27 micrograms per 100 cc., TIBC 339 micrograms per 100 cc., 8 per cent saturation). The bone marrow revealed erythroid hyperplasia and no iron deposits. Multiple stool examinations for occult blood revealed 2-3+ results. The patient was placed on parenteral iron. After 1,500 mg. of intramuscular iron the hemoglobin began to rise while the reticulocyte count changed from 1.2 to 6.3 per cent. Because the stools remained strongly positive for occult blood, a total of 4.0 Gm. of parenteral iron was given over 30 days (3.5 Gm. intramuscularly, 0.5 Gm. intravenously). Thirty-two days after the inception of the parenteral iron the hemoglobin concentration was 12.5 Gm. per 100 cc., MCV 92 micrograms, MCHC 28 per cent.

These 2 cases may be considered as refractory to oral iron therapy despite clear-cut indications for iron deficiency. A major contribution to the refractory state appeared to be continued blood loss. In the first case this interpretation was supported by the satisfactory response once the source for the blood loss was eradicated. In the second case either the blood loss became minimized or a sufficient dose was given to overcome this adverse influence.

Indications for Parenteral Iron Therapy.—Coleman, Stevens and Finch[5] have summarized the indications for parenteral iron therapy by the following list: (1) intolerance to oral iron; (2) gastrointestinal disease which is adversely affected by oral iron; (3) creation of iron stores; (4) poor absorption of iron.

All of these indications have been utilized in the

TABLE 4.—*Study of Rate of Generation of Hemoglobin Mass in a Patient Treated with Parenteral Iron.*

Day	Hb. Gm./100 cc.	Hemat. %	Blood Vol. cc.	Total Hb. Gm.	Gain Total Hb. Gm.	Gain Hb. Gm./100 cc./Day	Gain Hb. Gm./Day	Iron Used for Hb./Day mg.
0	5.9	22	6,065	291				
36	10.7	42	6,798	724	433	0.16	12	40

This patient received 2.5 Gm. of iron as the iron dextran preparation intramuscularly. After 36 days the increment in hemoglobin was measured by the blood volume method. According to these data the total iron utilized effectively per day by the bone marrow for peripheral hemoglobin production was 40 mg.

present experience. It appears, however, that two indications have been prominent, namely, continued blood loss with its interference with the effectiveness of oral iron and an apparent failure of our patients to abide by the prescribed oral intake. We also have encountered the patient whose iron deficiency responds to oral iron but who rapidly becomes anemic when blood loss resumes. The latter group seem to fit into the group whose iron stores are insufficiently replenished by oral iron as discussed by Finch and coworkers.[6]

Complications.—Complications were rare in the present series. For instance, the patient in case 2 received 16 injections and had no reactions. There was 1 case of a skin rash lasting 24 hours, 1 example of lumbar pain, 1 instance of leg cramps, 1 severe reaction with chills, fever, back pain, and hypotension, and 1 instance of chills and fever followed by generalized lymphadenopathy. In 4 cases an abscess developed at the site of intramuscular injection. No deaths were attributed to the therapy. The experience is consonant with a high safety factor for parenteral iron as used for these cases.

SPECIAL CHECK ON REACTIONS

An additional check on reactions to intramuscular iron was conducted by observing closely 122 patients who received 1 to 5 injections of intramuscular iron (each 5 to 10 cc. containing 250 to 500 mg. of iron). At the time of the injections these patients were receiving no other medications. In no instance was the temperature chart altered in the following 24 hours. No patient reported undue pain (no greater than an injection of penicillin). There was no generalized reaction in this group.

GENERAL COMMENT

In the present series of patients the main indications for the use of parenteral iron have included a disinclination on the part of this group of patients to maintain themselves on oral iron and failure of oral iron to give the desired results when the patient appeared to cooperate with the prescribed oral iron regimen (0.3 Gm. of ferrous sulfate orally 3 times daily). Utilizing these approaches the use of both the intravenous and the intramuscular preparations have been attended by a minimal incidence of reactions and a very satisfactory response to therapy when certain complications were not present. This experience raises the question of the need to liberalize the indications for parenteral iron therapy as the indications are currently considered in the literature.

The schedule for parenteral iron used has included a consideration of the peripheral hemoglobin deficit and the deficit in the iron stores as described by Finch and coworkers. The amounts used prior to the appraisal of effectiveness were insufficient to give rise to iron overload.[12] The therapy is reasonably precise and effective. The cost of such an approach may not be a prohibitive factor. Thus the main concern over the use of parenteral iron appears to center about reactions. It is still early to be certain of this point, but it may well be minimized, particularly with the use of the intramuscular preparation.

The response to parenteral iron was satisfactory in about 70 per cent of the patients. The 30 per cent group, which failed to respond satisfactorily, included all ages. The main interference with response included specific complications. Most of these were readily detected and included infection, uremia, malignant disease, and continued active blood loss. Continued blood loss on occasions required definitive management of the lesion responsible before a satisfactory result transpired.

SUMMARY

Parenteral iron therapy has been used in 103 patients with evidence of iron deficiency and anemia. The main indications for the use of parenteral iron in this series included disinclination toward oral iron by the patients and failure of oral iron to effect a satisfactory response.

Sixty-nine (about 70 per cent) of the patients had a satisfactory response to therapy as indicated by an average rise in hemoglobin concentration of 0.275 Gm. per 100 cc. of blood per day.

Thirty-one of the patients (about 30 per cent) had a poor response as indicated by a rise in hemoglobin of less than 0.1 Gm. per 100 cc. of blood per day. In 26 of this nonresponsive group overt complications appeared to prevent the proper response. These included infection, uremia, carcinoma, and continued blood loss.

It may be possible to overcome the adverse influence of continued blood loss on the response to therapy by increasing the dose of parenteral iron over the 2 to 5 week period of therapy. On occasions a satisfactory response was obtained only after definitive management of the lesion responsible for the blood loss had been instituted.

Complications were not a major feature of this experience. In view of this and the reasonably precise nature of the therapy and the satisfactory response at all ages, it may be of value to liberalize the indication for parenteral iron therapy in iron

deficiency as indications are now considered in the literature.

REFERENCES

1. Barkan, G., and Walker, B. S.: Determination of Serum Iron and Pseudohemoglobin Iron with O-Phenanthroline, J. Biol. Chem. 135:37-42 (Aug.) 1940.
2. Bass, R. K.; Bondy, R. K.; Halden, E. R.; and Muirhead, E. E.: Rate of Hemoglobin Generation After Intravenous Iron Therapy in Adults and Infants with Iron Deficiency, in preparation.
3. Beutler, E.: Iron Enzymes in Iron Deficiency; Cytochrome C, Am. J. M. Sc. 234:517-527 (Nov.) 1957.
4. Clegg, J. W., and King, E. T.: Estimation of Haemoglobin by Alkaline Haematin Method, Brit. M. J. 2:329-333 (Sept. 19) 1942.
5. Coleman, D. H.; Stevens, A. R., Jr.; and Finch, C. A.: Treatment of Iron Deficiency Anemia, Blood 10:567-581 (June) 1955.
6. Finch, S.; Haskins, D.; and Finch, C. A.: Iron Metabolism; Hematopoiesis Following Phlebotomy; Iron as Limiting Factor, J. Clin. Invest. 29:1078-1086 (Aug.) 1950.
7. Haskins, D.; Stevens, A. R.; Finch, S. C.; and Finch, C. A.: Iron Metabolism; Iron Stores as Measured by Phlebotomy, J. Clin. Invest. 31:543-547 (June) 1952.
8. Horrigan, D. L.; Mueller, J. F.; and Vilter, R. W.: Observations on Intravenous Administration of Saccharated Oxide of Iron in Human Beings, J. Lab. & Clin. Med. 36:422-427 (Sept.) 1950.
9. Josephs, H. W.: Iron Metabolism and Hypochromic Anemia of Infancy, Medicine 32:125-213 (May) 1953.
10. Kitzes, G.; Elvehjem, C. A.; and Schuette, H. A.: Determination of Blood Plasma Iron, J. Biol. Chem. 155:653-660 (Oct.) 1944.
11. Mayerson, H. S., and others: Comparison of Results of Measurement of Red Blood Cell Volume by Direct and Indirect Technics, Am. J. Physiol. 155:232-238 (Nov.) 1948.
12. Muirhead, E. E.; Crass, G.; Jones, F.; and Hill, J. M.: Iron Overload (Hemosiderosis) Aggravated by Blood Transfusions, Arch. Int. Med. 83:477-501 (May) 1949.
13. Rath, C. E., and Finch, C. A.: Sternal Marrow Hemosiderin; Method for Determination of Available Iron Stores in Man, J. Lab. & Clin. Med. 33:81-86 (Jan.) 1948.
14. Rath, C. E., and Finch, C. A.: Chemical, Clinical, and Immunological Studies on Products of Human Plasma Fractionation; Serum Iron Transport; Measurement of Iron Binding Capacity of Serum in Man, J. Clin. Invest. 28:79-85 (Jan.) 1949.
15. Sterling, E., and Gray, S. J.: Determination of Circulating Red Cell Volume in Man by Radioactive Chromium, J. Clin. Invest. 29:1614-1619 (Dec.) 1950.
16. Wintrobe, M. M.: Simple and Accurate Hematocrit, J. Lab. & Clin. Med. 15:287-289 (Dec.) 1929.
17. Wintrobe, M. M.: Clinical Hematology, ed. 4, Philadelphia, Lea and Febiger, 1956, p. 385.

♦ Dr. Bass, 3205 Oak Lawn, Dallas.

Drs. Halden and Muirhead, University of Texas Southwestern Medical School, 5323 Harry Hines Blvd., Dallas 19.

Publication Reports on Diabetes

Diabetes mellitus, the eighth leading cause of death in this country, is the only major cause of death in which female mortality exceeds male mortality, points out an issue of "Patterns of Disease," a publication prepared by Parke, Davis, and Company.

Illustrating the mortality tolls graphically, the publication reports that among children and young adults, the death rates of diabetic patients is 5 to 10 times higher than the death rate of nondiabetics, and among middle aged and elderly persons this ratio is at least two to one. The death risk for women is almost 40 per cent greater than that for men.

"Patterns" also includes information about the "hidden" diabetic and on complications of pregnancy among diabetic women.

Radiologic Considerations In Diagnosis And Treatment Of Intussusception

EDWARD B. SINGLETON, M.D.

Houston, Texas

OF THE MANY abnormalities affecting the intestinal tract in children, ileocolic intussusception is of unique interest to the radiologist because it offers him the opportunity of both diagnosis and immediate treatment. The radiologic signs of intussusception are characteristic, and the reliability of the radiologist in evaluating these signs is recognized clearly. However, there still remains considerable diversity of opinion as to the justification of the radiologist or anyone to attempt reduction of an intussusception by the use of hydrostatic pressure exerted by an enema. It is regrettable that these differences exist, because in fact they are not competitive forms of treatment.

The prevailing opinion in this country favors operative reduction, but in the Scandinavian countries, through the works of Nodentoft[7] and Hellmer[2] and in Australia through the efforts of Hipsley,[3] reduction by hydrostatic methods is favored. An accurate statistical evaluation of the two methods is not readily possible, because generally it is not recognized that prolonged and persistent attempts at re-

Dr. Edward B. Singleton, director of radiology at the Texas Children's Hospital, Houston, presented this paper before the Section on Radiology at the Texas Medical Association's annual session April 21, 1958, in Houston.

Operative and nonoperative methods of reduction of ileocolic intussusception in infants should not be considered as competitive but as different approaches to the same solution. The paper gives the criteria used in selection of patients at Texas Children's Hospital in whom hydrostatic reduction is attempted and the radiographic description of the diagnosis and nonoperative treatment of intussusception.

duction by enema usually are necessary to accomplish the reduction. Unless this is understood, the radiologist, after recognizing the lesion under fluoroscopy and failing to accomplish the reduction after a few moments of sustained hydrostatic pressure, may discontinue his efforts and the patient be prepared immediately for surgery. It is the purpose of this article to consider the reasons for and against hydrostatic reduction and to consider the criteria used at Texas Children's Hospital for determining whether or not reduction by this method should be attempted.

Historically the treatment of intussusception by enemas dates back to the age of Hippocrates, who advocated the use of enemas in all forms of ileus. Other historical examples of the treatment of intussusception are the use of effervescent powders instilled within the rectum, insufflation of the colon with hydrogen sulfide, and the retrograde passage of bougies. In 1876 Hirschsprung[4] published the first detailed account of reduction by the use of hydrostatic pressure, reporting a mortality rate of 35 per cent. It was not until 1927 that Pallin and Olsson[8] in Sweden and Retan[10] in the United States first reported the reduction of intussusception by barium enema under fluoroscopy. Hutchinson[5] is credited with the first successful operative reduction in 1871, and for many years following this the surgical results had a much higher mortality than enema reduction. Now, however, because of safer anesthetics and the improvement in operative technique and postoperative care, the mortality rate by either method of treatment is equal and dependent upon the duration of the illness and the condition of the patient when first seen. The problem now resolves itself into whether or not an attempt shoud be made initially to reduce the intussusception and, if unsuccessful, to subject the child to surgery or to proceed immediately with operative reduction.

CHOICE OF METHOD OF REDUCTION

In order to determine the feasibility of hydrostatic reduction it is necessary to consider the arguments for and against this method of treatment.

The proponents of operative reduction claim the following:

1. The use of hydrostatic pressure may reduce or rupture devitalized bowel which can be recognized only by direct inspection. In regard to this, Ravitch and McCune[9] have demonstrated that in experimentally produced intussusception if the bowel was gangrenous, it was irreducible and in no instance did bowel, gangrenous or not, rupture as long as the hydrostatic pressure was no more than 3 or 3½ feet. In my own experience, devitalized bowel has never been reduced by nonoperative methods nor has an attempt at nonoperative treatment resulted in bowel perforation even when devitalized bowel was found at time of laparotomy.

2. The intussusception may be produced by a definite lesion such as a polyp, lymphoma, hypertrophied Peyer's patch, Meckel's diverticulum, aberrant pancreas in the ileum, mesenteric lymph node, or ileal duplication, none of which can be recognized except by surgical inspection. In answer to this, it is pointed out that a definite lesion is present in only 2.5 per cent of children less than 2 years of age, and 70 to 90 per cent of the intussusceptions occur during this period. In Gross' large series of cases,[1] 75 per cent were under 1 year of age and 85 per cent under 2 years. Consequently, the possibility of a definite lesion being present in infants is remote, and if present, the possibility of it being of significance other than as a cause of the intussusception is practically nil.

3. The enema serves only to deplete the remaining physical reserve of the child resulting in the infant being a greater surgical risk if enema reduction fails. This is not necessarily true. Supportive measures should be started, if indicated, even before a diagnostic barium enema is begun. Enema reduction is far less traumatic to the child than operative reduction, and there is no convincing evidence that unsuccessful attempts at nonoperative reduction create a greater surgical risk as long as supportive measures are being provided.

4. The child is exposed to too much radiation. This is probably the most convincing argument against reduction under fluoroscopy. However, the amount of exposure by the experienced radiologist who keeps the size of the field to a minimum and whose observations during the reduction are limited to split second glances is scarcely more than encountered in a routine colon examination.

The advantages of nonoperative reduction are obvious. The child is not subjected to the hazards of a general anesthetic and a laparotomy even though these dangers may be minimal. In addition the patient's hospital stay is shortened greatly.

Although the preceding discussion has described the pros and cons of operative and nonoperative reduction, I prefer to consider the two methods not as being competitive, but as being different approaches to the same solution—there being indications for each method of reduction. In addition, if nonoperative reduction is not successful, the procedure has at least facilitated the surgical approach by producing partial reduction. At the Texas Children's Hospital an abdominal scout film is obtained on every child suspected of having an intussusception, and this is followed by a diagnostic barium enema. The responsibility of whether or not an attempt should be made to reduce the intussusception by nonoperative

methods rests with the radiologist. The selection of cases in which a real effort is made to reduce the intussusception under fluoroscopy depends upon the age of the patient, the presence or absence of radiographic signs of advanced intestinal obstruction, and whether or not there is clinical evidence of peritonitis.

If the child is 3 years of age or older, reduction by enema is not attempted. I believe that after this age, there is usually a definite lesion responsible for the intussusception, and although these lesions are usually benign, they may be responsible for future difficulties. Also, an occasional lymphosarcoma may be missed without surgical intervention.

Success at the Texas Children's Hospital in reducing an intussusception by enema in the presence of advanced radiographic signs of obstruction (marked distention of small bowel, multiple air fluid levels) has been poor and usually due to either an ileo-ileal intussusception or to extensive edema and gangrene of the intussusceptum. Consequently, no attempt is made to accomplish reduction in the presence of an abdominal radiograph showing these characteristics.

Clinical evidence of peritonitis consisting of high fever, leukocytosis, and acute abdominal tenderness usually indicates the complication of gangrenous bowel. Ling[6] has stressed the contraindications of enema reduction in the presence of peritonitis, but I have not seen peritonitis associated with intussusception without advanced radiographic evidence of obstruction. Although the duration of the process is considered by some to be the determining factor in the method of reduction, I have not found this to be necessarily true. If a longer duration has resulted in a greater degree of obstruction, there will be considerably more difficulty in accomplishing the reduction by enema. But if the intussusception is not accompanied by obstruction, there apparently is no relationship between the duration and ease of reduction by hydrostatic pressure.

Except for the contraindications listed previously, an attempt is made to reduce the majority of cases of intussusception coming to the Children's Hospital. In most of these, complete reduction may be accomplished, and if not, there is at least partial reduction often to the region of the ileocecal valve, thereby facilitating the surgical reduction. In none of the cases at the hospital has there been evidence that barium enema was harmful to the patient. In those intussusceptions which show definite clinical evidence of recurrence, surgery is undertaken without barium enema because of the high incidence of a definite etiological lesion in the recurrent case. If clinically it is questioned whether there has been a recurrence, a diagnostic barium enema is performed, and if intussusception is found, no attempt at reduction by the enema is made.

RADIOLOGIC EXAMINATION

In all cases scout roentgenograms of the abdomen with the patient in the supine and upright positions should precede fluoroscopy. The distribution and amount of intestinal gas may not be unusual in early cases of intussusception, but may be within the colon and small bowel in normal quantities. An intussusception associated with a scout roentgenogram such as this is usually easily reduced by hydrostatic pressure (fig. 1). In regard to this, one should be aware of the normal variations in the gas pattern of infants.[11] The presence of small bowel gas even associated with moderate distention of bowel and air fluid levels is not necessarily abnormal. A common finding is that of a moderate increase in amount of gas within the ileum and a decrease in the amount of colonic gas. If there is marked distention of small bowel associated with absence or nearly complete absence of gas within the colon, there is obviously a high degree of obstruction. In such instances the possibility of reduction by hydrostatic pressure is less probable, but should be accepted. The presence of obvious fluid content within the abdomen associated with marked distention of small intestine is presumptive evidence that perforation of bowel and peritonitis has occurred. In such cases an enema study even for diagnostic purposes is not undertaken.

A vague area of density corresponding to the location of the palpable intussusception often is identified. This is usually in the right lower quadrant or right flank, but may be in the epigastrium or left side of the abdomen depending upon the extension of the intussusception. A relative lack of intestinal gas is usually evident in the right lower quadrant and along the path of the invagination.

Fluoroscopy is begun after inserting an unlubricated number 16 Foley or Bardex catheter. A catheter of this large size is necessary to permit a sufficiently forceful flow to maintain the necessary hydrostatic pressure. Occasionally it is difficult to insert this type of catheter past the anal sphincter without lubrication, but by simply wetting it, its passage is facilitated. The use of the lubricant enables the infant to expel the inflated bag and the ease with which this is accomplished by a straining infant is always an astonishing feat. After the catheter is passed into the rectum, the sides of the buttocks are compressed together by means of adhesive tape and the Foley bag inflated. The barium container should be at a height of 3 feet above the table top. The hydrostatic pressure exerted by the barium column at this height is insufficient to damage the colon and yet sufficient

over a sustained period to accomplish reduction in the reducible cases.

With the infant in a supine position and an attendant at the head of the fluoroscopy table holding the infant's shoulders and with the fluoroscopist's right hand or the hands of another attendant on the infant's thighs, the enema is begun. As a rule the colon fills rapidly until the head of the intussusception is encountered where there is an abrupt obstruction to the retrograde flow of barium. The configuration of the lead point of the barium column is that of a concave meniscus, the concavity produced by the distal end of the intussusceptum. With continued hydrostatic pressure, extension of the contrast material along the margins of the meniscus is noted with engulfing of the intussusceptum which persists as a filling defect in the head of the barium column (fig. 2). As reduction of the intussusception occurs, this filling defect is displaced proximally along the path of the colon until it reaches the region of the ileocecal valve. At this point barium often is identified extending around the mass and

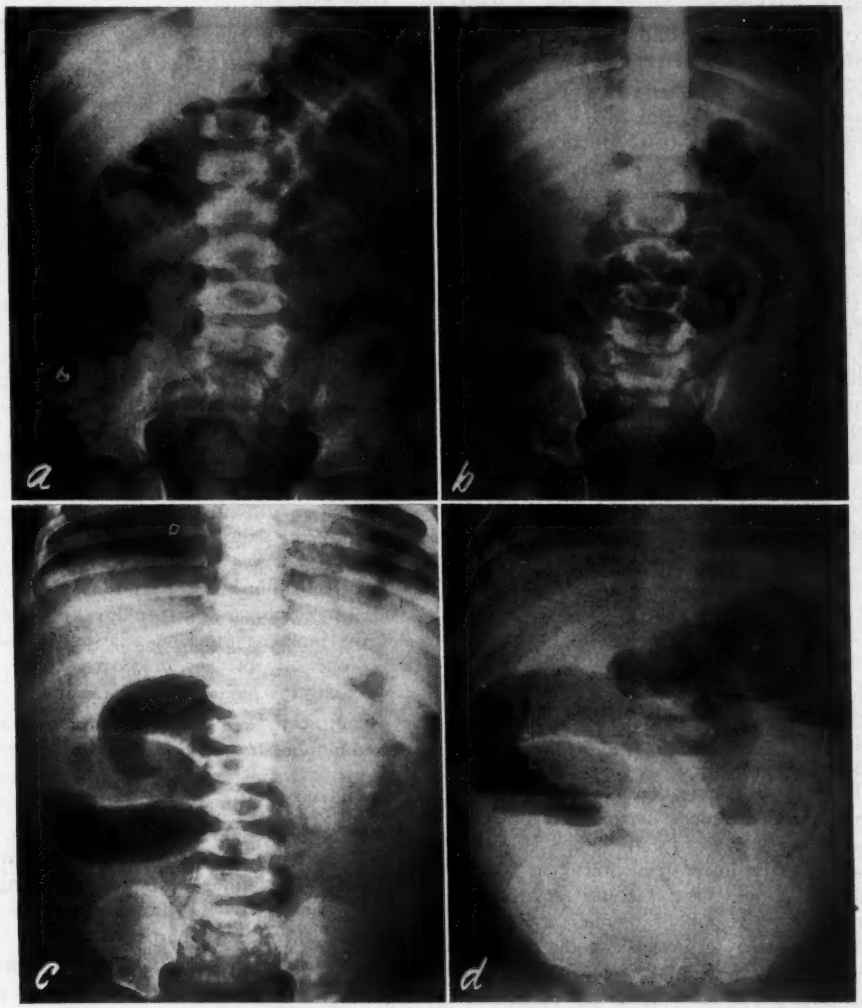


Fig. 1. Variation in gas pattern of infants with ileocolic intussusception.

a. Relatively normal gas pattern with gas in the colon and small intestine in normal amounts (arrow denotes location of intussusception).

b. Nearly complete absence of gas from the colon with beginning distention of the small bowel. Reduction by hydrostatic pressure should be anticipated but with more difficulty than in **a.**

c. Complete absence of colonic gas with distention of the terminal ileum. Reduction by hydrostatic methods is doubtful.

d. Marked obstruction with free peritoneal fluid. Attempts at hydrostatic reduction are contraindicated.

Fig. 2. Steps in hydrostatic reduction: **(a)** intussusception encountered at the hepatic flexure, **(b)** reduction to region of the ileocecal valve, and **(c)** complete reduction.

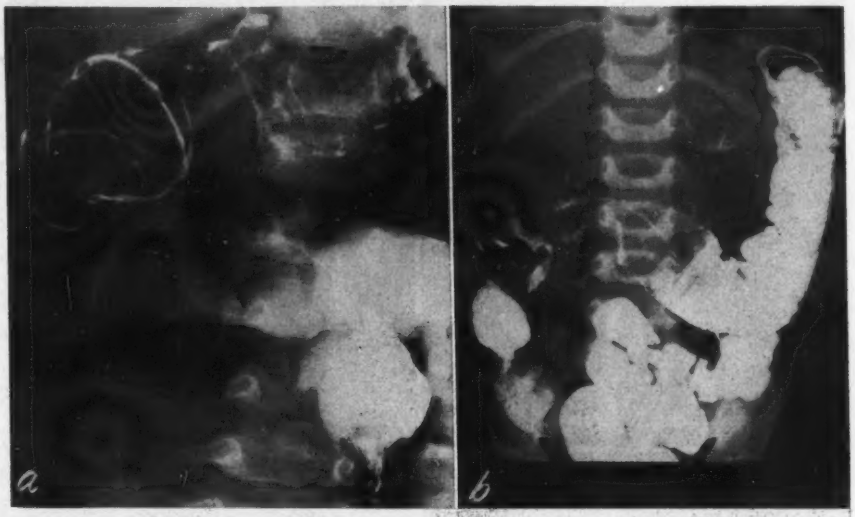


Fig. 3. a. Typical "coiled spring" appearance of intussusception after evacuation of contrast material.
b. Intussusception showing central linear density of barium within the compressed intussusception.

(After Singleton, E. B.: X-Ray Diagnosis of Alimentary Tract in Infants and Children, Chicago, Year Book Publishers, 1959.)

entering the cecum and appendix. Attempts to reduce the intussusception by palpation through the abdominal wall while the enema is administered is of little value and may be harmful by increasing the intraluminal pressure to the point of bowel damage. However, gentle palpation in the direction of the ileocecal valve may be used after the intussusception has been nearly completely reduced.

The cecum and proximal portion of the ascending colon often appear angulated medially. This is the result of traction produced by the mesentery of the ileal intussusceptum. Complete reduction is determined by identifying contrast material passing into terminal ileum. This at times may be difficult because of overlapping of the distended rectosigmoid. By careful positioning and appropriate spot films, however, the entrance of barium into the ileum can be verified. One should be certain that an adequate amount of terminal ileum has filled in order to exclude an ileo-ileal intussusception.

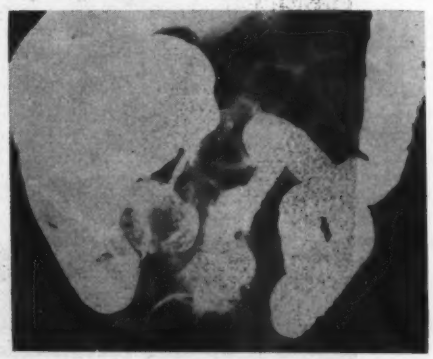


Fig. 4. Ileo-ileal intussusception in which the ileocolic component has been reduced, but a filling defect within the ileum remains.

The reduction of an ileocolic intussusception as described may be accomplished with extreme rapidity, but more often it takes a period of patient

waiting. Fluoroscopy should be kept at a minimum with brief interval glimpses of the head of the barium column and with the field narrowed to include only this area.

The first site of resistance to the reduction is usually in the hepatic flexure. If a few minutes of sustained hydrostatic pressure failed to displace the intussusceptum, the infant is allowed to expel the barium and the process is repeated. Films made after evacuation usually show the pathognomonic "coiled spring" sign which is due to barium trapped between the opposing mucosa of the intussusceptum and intussuscepiens (fig. 3). A central linear column of contrast material frequently is identified within the compressed lumen of the intussusceptum. The second attempt usually will reduce the intussusceptum to

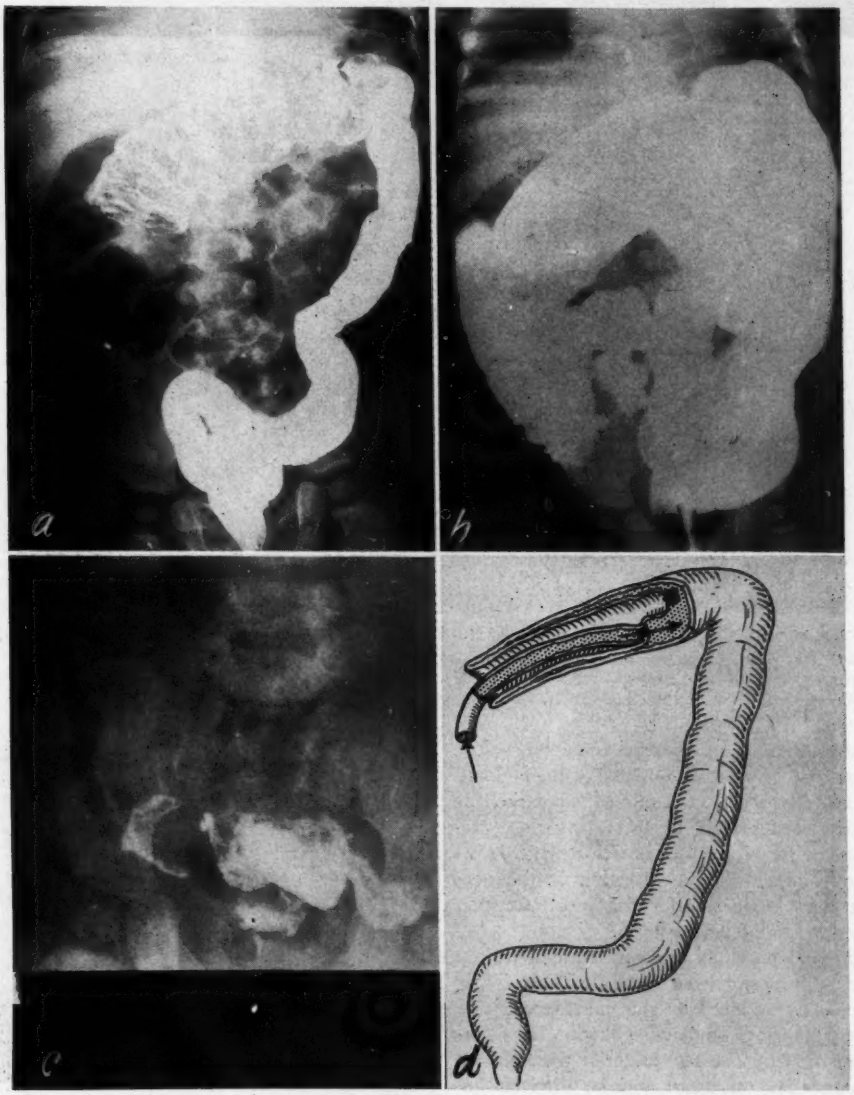


Fig. 5. Appendiceal-colic intussusception.

a. Large filling defect representing the intussusception occupying the transverse colon.

b. Reduction of intussusception with barium filling the ileum but with incomplete filling of the cecum.

c. Twenty-four hour film showing barium coating invaginated appendix.

d. Diagram of initial extent of the intussusception showing the ileum emptying into the fecal stream and thereby explaining the absence of obstruction symptoms for 6 weeks. (After Singleton, E. B.: X-Ray Diagnosis of Alimentary Tract in Infants and Children, Chicago, Year Book Publishers, 1959.)

the proximal portion of the ascending colon or ileocecal valve. Again, if the process of reduction stops, the infant is allowed to expel the enema and once more the procedure is repeated. If the third attempt does not succeed in filling the terminal ileum, the intussusception is considered irreducible and the patient is taken to surgery. Even in such cases, the major portion of the reduction has been accomplished and final reduction by surgery is facilitated.

Several types of intussusception deserve special mention. The reduction of the colonic component of an ileo-ileocolic intussusception may be accomplished, but the ileal component persists. This is determined by the inability to fill more than a few inches of the terminal ileum and occasionally by a filling defect within the lumen (fig. 4). No attempt is made to reduce an ileo-ileal intussusception by hydrostatic pressure because of the frequency of devitalized bowel in this condition, as well as the barrier produced by the ileocecal valve.

Colocolic intussusception may be suspected by the abrupt disappearance of the intussusception during fluoroscopy without the gradual displacement of the intussusceptum into the region of the ileocecal valve.

In cecal-colic intussusception, the ileum is filled before the cecum is distended. This may be impossible to differentiate between inverted appendiceal stump, but the history of the previous appendectomy is a differentiating point.

Appendiceal-colic intussusception usually is impossible to diagnose radiologically, it having an appearance similar to other forms of intussusception involving the colon. Description of a recent case of unusual interest follows.

An appendiceal-colic intussusception had been present in a child with vague abdominal pains for a period of 6 weeks. A palpable mass was identified in the left upper quadrant, and colon examination showed a typical intussusception with the intussusceptum located in the splenic flexure (fig. 5). Hydrostatic pressure succeeded in reducing the intussusception with satisfactory filling of the terminal ileum but with incomplete filling of the cecum. The patient, however, did not respond clinically, and a repeat abdominal scout film showed an inverted U configuration of retained barium in the region of the cecal tip. Because of persistent abdominal pain, the infant was subjected to exploratory surgery, and an appendiceal colic intussusception was discovered. This explained the appearance of the 24 hour film, the barium remaining coated over the partially invaginated appendix and cecum. It also can be assumed that the intussuscepted appendix served as a lead point for an extensive cecal-colic intussusception encountered during the barium enema. With this type of intussusception, the ileum is drawn into the intussuscipiens and the ileocecal valve opens almost directly into the colon fecal stream. This explains the lack of obstruction and the normal bowel movements over a long period of time.

SUMMARY

Either operative or nonoperative methods of reduction of ileocolic intussusception in infants should not be considered as competitive forms of treatment. Each has its own indications, and in many instances the two methods are complementary to each other. In this article a brief discussion is given of the arguments for and against reduction of intussusception by the use of hydrostatic pressure. Criteria used in the selection of patients at Texas Children's Hospital in whom hydrostatic reduction is attempted are given. The radiographic description of the diagnosis and nonoperative treatment of intussusception also is presented.

REFERENCES

1. Gross, R. E.: Surgery of Infancy and Childhood: Its Principles and Techniques, Philadelphia, W. B. Saunders Co., 1953.
2. Hellmer, H.: Intussusception in Children; Diagnosis and Therapy with Barium Enema, Acta radiol., supp. 65:1-120 1948.
3. Hipsley, P. L.: Intussusception and Its Treatment by Hydrostatic Pressure, Based on Analysis of 100 Consecutive Cases So Treated, M. J. Australia 2:201-206 (Aug. 14) 1926.
4. Hirschsprung, H.: Et Tilfaelde af Subakut Tarminvagination, Hosp.-Tid., Kjobenh. 3:321-327, 1876.
5. Hutchinson, J.: Successful Case of Abdominal Section for Intussusception, Tr. Roy. Med.-Chir. Soc., London 57:31, 1874.
6. Ling, J. T.: Intussusception in Infants and Children with Emphasis on Recognition of Cases with Complications, Radiology 62:505-513 (April) 1954.
7. Nordentoft, J. M.: Value of Barium Enema in Diagnosis and Treatment of Intussusception in Children, Acta radiol. 51:5, 1943.
8. Olsson, I., and Pallin, G.: Ueber das Bild der akuten Darminvagination bei Röentgenuntersuchung und über Desinvagination mit Hilfe von Kontrastlavements, Acta Chir. Scandinav. 61:371-383, 1927.
9. Ravitch, M. M., and McCune, R. M., Jr.: Reduction of Intussusception by Barium Enema; Clinical and Experimental Study, Ann. Surg. 128:904-917 (Nov.) 1948.
10. Retan, G. M.: Nonoperative Treatment of Intussusception, Am. J. Dis. Child. 33:765-770 (May) 1927.
11. Singleton, E. B.: Intestinal Obstruction in Infants, J. Pediat. 44:159-171 (Feb.) 1954.
12. Singleton, E. B.: X-Ray Diagnosis of Alimentary Tract in Infants and Children, Chicago, Year Book Publishers, 1959.

Dr. Singleton, Department of Roentgenology, Texas Children's Hospital, 6621 Fannin, Houston 25.

ABSTRACT OF DISCUSSION

DR. A. O. SINGLETON, JR., Galveston: In dealing with the problem of intussusception from the radiological standpoint, one immediately thinks of the controversial question as to whether the treatment should be entirely surgical or whether, before surgery is attempted, the reduction by barium enema of the intussusception should be tried. This argument has been going on for many years. More important than the method of treatment, however, is the early diagnosis of the condition.

In a review of 702 cases of intussusception, Izant and Clatworthy have reported a 12.4 per cent mortality in all cases with a mortality of only 1.6 per cent in those cases in which the duration of the disease was less than 24 hours. While accepting a trial of nonoperative reduction of the intussusception in the early case, many are critical of this method in dealing with the cases of longer duration. Ravich has pointed out, however, that barium enema reductions of intussusceptions can be accomplished in late cases. It has been shown that after 96 hours' duration, the mortality in intussusception actually decreases because of the filtering out of cases of fully developed frank gangrene. Ravich has

expressed the belief that where the viability of the bowel has been permanently impaired, reduction under low heads of pressure will not take place, and thinks that his experimental and clinical evidence confirms this. I can remember when such arguments were applied to strangulated hernias with the thought that in persons in whom the bowel circulation was irreversibly impaired, these could not be reduced. Unfortunately, I know of a number of examples where this has been demonstrated not to be true, and I am afraid that sooner or later perforation of gangrenous bowel with barium enema will occur.

Ravich has reported a 75 per cent reduction of cases of intussusception under fluoroscopic control. On the other hand, at the Langlet Foss Clinic in an attempt at barium enema reduction of intussusception in 19 cases, 6 were reduced, 10 were not reduced; in 13 cases in which surgical exploration was carried out, 7 had to be reduced manually, with intestinal resection being necessary in 4 cases.

If one is to undertake the barium enema reduction of intussusception, cooperation between the surgeon and radiologist must be highly developed. Often a great deal more time and effort must be spent by the principals concerned than with the early operative exploration of the patient. It should be stated that the surgical treatment of intussusception, especially in the early cases, has attained a high degree of success and satisfaction.

As to the value of roentgen ray in the diagnosis of this condition, many clinicians feel that it is unnecessary in many cases though extremely useful in the form of a flat film or finally a barium enema for diagnostic purposes in those cases where there is some doubt as to the diagnosis.

Diverticulosis and Diverticulitis Of the Colon

OTTO H. GRUNOW, M.D.;
R. P. O'BANNON, M.D.; and
HAROLD F. BERTRAM, M.D.

Fort Worth, Texas

S PERSONS AGE they become prone to more and more diseases. Some are unfortunate enough to develop a malignancy, some develop degenerative diseases, and others acquire infections. All of these are a threat to peaceful longevity. A degenerative disease which is encountered increasingly frequently after the patient is 40 years of age is the colonic diverticula. Statistically, diverticulosis occurs in 5 to 10 per cent of the population older than 40. It is found more frequently in men than women, but from barium studies it seems that the incidence in both must be higher than reported cases suggest.

Internists are more likely to see cases of diverticulosis early and have the problem of evaluating the poorly defined symptoms of constipation, diarrhea, flatulence, minor lower abdominal discomfort, and minor problems of micturition. Yet each may represent the clue to a diagnosis of diverticulitis. The physician who is accustomed to more dramatic or acute symptoms may tend to minimize the importance of diverticula.

Dr. Otto H. Grunow, a practicing radiologist, and his coauthors presented this paper for the Section on Radiology at the Texas Medical Association annual session April 21, 1958, in Houston.

The cause of diverticula in the colon is obscure, but aging is important. Early signs of inflamed diverticula usually are minor, but complications may be severe and lead to peritonitis and fistulas. Since diverticulitis is progressive it is wise to resect the involved segment early.

We do not wish to minimize nor magnify the importance of diverticula, but would like to use this opportunity to refresh our minds with current opinion tempered by personal experience.

Why diverticula develop has not been satisfactorily answered in spite of much study. Most writers agree that senescence is an important factor. Since the sacs are thought to occur at weak points in the bowel wall and since they are associated, according to the literature, with blood vessels piercing the muscular coat, it is surmised that the blood vessels are at fault for weakening of the bowel. It is strange that no photomicrographs of diverticula included the blood vessel. Moreover, one would expect more bleeding with these diseases. Perhaps they should be suspected more strongly in obscure gastrointestinal tract bleeding.

The sacs are found rather frequently in association with appendices epiploicae. They thus acquire a fatty coat in addition to the mucosa, submucosa, and serosa. It has been argued that a great increase in weight or sudden loss of weight would disturb the fat relationship about the bowel and make the occurrence of diverticula more likely. Attempts to dislodge constipated stool are said to increase the intraluminal pressure and facilitate herniation. However, many of those who suffer from constipation do not have the disease. Women, who as a rule are more frequently afflicted with constipation than men, are less likely to have diverticulosis. The theory of insults of repeated fresh stools and storage in the sigmoid

followed by bacterial action and toxins has gathered a number of adherents.

The sacs are found more frequently on the sigmoid and distal descending colon than in other portions of the large bowel. They have a predilection for the convex instead of the concave portion of the sigmoid and tend to lie in rows between the taeniae.

In this connection it is interesting to recount an experience of Seymour Barling, an English surgeon. During a laporatomy he was fortunate enough to see a peristaltic wave pass through the sigmoid. The gut contracted to the size of a finger and became rigid during which time a large number of tiny sacules appeared between the longitudinal muscles only to disappear as the wave passed on.

EXAMINATION FOR DIVERTICULA

The easiest and probably the most dependable way to examine for diverticula is through the use of roentgen rays and a contrast enema. They can be discovered if sought for during laparotomies, but they are not self evident. They are rarely recognized during sigmoidoscopy. Willard and Bockus saw only 1 over a 10 year period. At necropsy, they are easily demonstrated, provided one rips away the overlying fatty tissues. They are bluish black because of their thin wall and the color of their contents. If the examiner looks closely, the muscle appears to extend slightly up along the necks. In the relaxed state, the opening seems to pass through a papilla and have a slitlike shape. The simple roentgenogram of the abdomen may reveal their presence as small collections of air.

Much has been written regarding the exact method of performing the roentgen study. Advocates can be gathered for the single contrast method, the double contrast method, or the use of a nonabsorbable opaque medium such as Gastrografin. Some claim that only a small amount of barium is needed and that this should be propelled further by the introduction of air. Others insist on many spot films, pressure cones, and much rolling of the patient. Even laminagrams and kymograms have been proposed. With the inept none of these approaches is foolproof. It would be wiser to direct one's attention to the disease, doing those things which will demonstrate and prove the disease, rather than to be hampered by some prescribed pattern of examination.

Diverticula are ordinarily filled with soft fecal material. Sometimes air is present. Rarely is the material inspissated. Radiographs of the abdomen after a contrast study usually reveal a residue of opaque material which is gradually replaced in a manner similar to that seen in the appendix. It is likely that the sacs may not fill on the instillation of barium but become visible in the interchange during evacuation. They may be obscured by reflux of barium through the distal ileum. They may be accentuated by the presence of air, or they may lose significant contrast and suggest polyps by the same procedure. Moreover, the offending diverticulum in an inflammatory process is least likely to fill because of the edema, spasm, or inflammatory tissue about its neck.

DISEASED DIVERTICULUM

In the early stages of development, diverticula are tractile. The tiny herniations are reduced as the pressure subsides. When they extend beyond the limits of the muscle coat, they no longer can return, and the pathway for trouble is prepared. Interchange of fecal material becomes limited, and inspissation becomes a real threat. Likely the hard material now will traumatize the mucosa as a wave passes. Irritation leads to inflammation and edema, and this to further obstruction and destruction. During this period symptoms are hard to evaluate and may consist of minor colicky pains or disturbances in the bowel movements.

A fulminating involvement followed by localized necrosis may result in a rupture leading to generalized peritonitis.

CASE 1.—J. M. K., a 43 year old white man, had frequently complained of gas and bladder irritability for 6 years. Sigmoidoscopy was negative, and colon studies revealed a diverticulosis of minor degree. A hemorrhoidectomy was done for rectal bleeding. He fared well until 1 year before this hospital admission when he had multiple complaints which were hard to evaluate. Chest pains were relieved by passing a small quantity of flatus. Eight months previously he had nausea, vomiting, and diarrhea, which subsided. Mental tension was suspected. On the night before entry he developed a cramping abdominal pain with vomiting. There was tenderness in the lower part of the abdomen centrally and to the left. An excretory urogram was normal, but the leukocyte count rose to 14,800. By evening he had evidence of pneumoperitoneum and a generalized peritonitis. A ruptured diverticulum was discovered on laporatomy.

When the process is not so acute, there is time for defense measures. The serosa and bowel wall thickens forming a thick sausage-like structure which can combat the inflammatory process and at least hinder the acute perforation. The abscess which forms may be well walled off, and a plastic peritonitis which indents the margin of the gut may be demonstrated.

CASE 2.—E. A. L., a 64 year old white man, complained of frequent semisolid stools without pus, blood, or mucus 2 weeks before examination. Three days before examination he developed intermittent cramping pains which doubled him up and were associated with vomiting. Examination revealed a soft abdomen without palpable masses.

Temperature ranged from 98 to 101 F. He was dismissed after 6 days of medical management apparently in good health. The roentgenogram revealed an indentation of the bowel wall suggesting a reaction to plastic peritonitis about the site of diverticulitis.

CASE 3.—J. G. B., a 69 year old white woman, was perfectly well until 10 days before admission when she had a chill followed by fever with abdominal pain. There was continued constipation, nausea, and anorexia. Examination revealed a tender mass in the pelvis which could be felt on vaginal examination. White blood cell count was 13,300. Surgery revealed an indurated mass which adhered to the sigmoid and ileum. The sigmoid was not resected. No malignancy was found. On roentgen examination a well defined early perforation of a diverticulum could be demonstrated.

CASE 4.—W. J. K., a 60 year old white man, complained of diarrhea intermittent in character for 3 weeks. This was associated with cramping and weakness. A mass 15 cm. in diameter was felt in the left lower part of the abdomen. The white blood cell count was 7,700. Surgery revealed no malignancy, but an extensive diverticulosis with chronic diverticulitis. A chronic abscess was attached to the mesocolon. The mass was firmly adherent to the bladder and ureter.

Adjacent organs frequently are affected by the inflammatory process to the point that they may be invaded by the abscess in its attempt to find an outlet.

CASE 5.—C. U., a 62 year old man, had severe diarrhea for 6 months with loss of weight and strength. Radiography revealed an ileocolic fistulous tract.

In the female a common site of fistula formation is the uterus and vagina. Other fistulous tracts have been known to open onto the anterior abdominal wall, through the ischial rectal space, and through the flank, as well as eroding a tunnel through the mucosa forming an intraluminal fistula.

CASE 6.—P. M., a 52 year old white man, was known to have had diverticulitis. Ten days before seeking treatment he had dysuria, frequency, and pyuria and passed gas on urination. Cystoscopy revealed a fistulous tract apparently related to a firm tender mass on the right at the level of the seminal vesicles. A colostomy was unsuccessful in allaying the inflammation, and the tract between the sigmoid and the bladder was closed and a sigmoid resection performed 4 months later. Considerable difficulty was encountered in demonstrating the tract roentgenographically.

One of the many ways in which the disease may make itself felt is demonstrated in the following case:

CASE 7.—S. A. T., a 63 year old white man, developed unexplained fever 3 weeks before examination. He was a known asthmatic with chronic bronchitis. An examination revealed only an increase in the size of the abdomen and microscopic hematuria. An excretory urogram revealed a left hydronephrosis with a hydroureter which was obstructed at the level of the sacroiliac joint. A retrograde examination revealed no stones, and a primary malignancy of the ureter was suspected. A barium enema with a left ureteral catheter in place revealed a filling defect suggestive of diverticulitis at the level of the ureteral block. The relation of the two was established by surgery.

THERAPY

The concepts of therapy of diverticulitis have changed in the last decade. Previously the disease was treated medically, and surgery was considered a last resort in complicated cases. With the realization that diverticulitis is a progressive disease and with the increased safety of direct surgical attack on the diseased bowel, we have revised our therapeutic tenets, particularly if we are permitted by circumstances to choose our time. Approximately half of the cases of diverticulosis will progress to diverticulitis. Recurrent attacks of inflammation are now considered to be an indication for resection of the involved section of the colon before the more serious complications arise. Patients who develop symptoms of urinary bladder irritation, dysuria, or pyuria should be advised to submit to surgery immediately before they develop a vesicocolic fistula.

The problem of the differential diagnosis between carcinoma and diverticulosis and diverticulitis with inflammatory granuloma formation is frequently brought up. Although there are certain well defined observations which suggest one or the other, the patient's course may throw considerable doubt upon diagnosis. Ordinarily the inflammatory process is approximately 8 cm. in length or longer, whereas a carcinomatous involvement usually involves a much shorter segment. Frequently the normal mucosal pattern can be followed through the area of the inflammatory process. The multiple diverticula can be seen along the edges. In a carcinomatous involvement there is usually a gross disturbance of the mucosa. There is also a tendency for a minor dilatation of the proximal gut with beaklike projections along each side as if the gut were trying to intussuscept the tumor. The improved methods of surgery would suggest a direct surgical attack in either case and the differential diagnosis becomes less of a problem.

SUMMARY

From this study we have determined that the explanation for the development of diverticula in the colon remains obscure but that the aging of the tissues is an important factor.

The early signs of inflamed diverticula are usually minor in character and oftentimes not considered important by the patient.

The complications of inflamed diverticula may be severe and may lead to localized and generalized

peritonitis, and fistulous tracts leading to the uterus, ischiorectal space, the bladder, the flank, the ileum, the ureter, or any adjacent organ may appear.

Since diverticulitis is a progressive disease it is wise to resect the involved segment early. Resection is less hazardous than before because of the newer developments in surgery.

REFERENCES

1. Bockus, H. L., and others: Gastro-Enterology, Philadelphia, W. B. Saunders Co., 1944, vol. 2, p. 694.
2. Boyd, W.: Surgical Pathology, ed. 6, Philadelphia, W. B. Saunders Co., 1947, p. 75.
3. Massik, P., and Wheatley, F. E., Jr.; Recognition of Air in Diverticula of Colon as Diagnostic Aid, Radiology 64:417-418 (March) 1955.
4. Wolf, B. S.; Khilnani, M.; and Marshak, R. H.: Diverticulosis and Diverticulitis: Roentgen Findings and Their Interpretation, Am. J. Roentgenol. 77:726-743 (April) 1957.

Drs. Grunow and Bertram, 650 Fifth Avenue, Fort Worth 4.
Dr. O'Bannon, 1216 Pennsylvania, Fort Worth.

ABSTRACT OF DISCUSSION

DR. JAMES R. RILEY, Corpus Christi: Drs. Grunow, O'Bannon, and Bertram have presented an excellent and timely paper. This subject has been made timely by the degree of its neglect during the past few years.

I find no reason for disagreement with the authors, but as a result of my own experience, there are certain facts which might deserve more emphasis.

First of all, the advent of Sulfasuxidine and similar substances has so improved the over-all surgical cure rate that I believe diverticulitis should be considered a surgical disease primarily. Much semi-invalidism and development of neurotic personalities in those afflicted could be avoided by early surgical extirpation of the diseased segment.

The authors have enumerated the finer diagnostic points in differentiation of carcinoma from diverticulitis. I would like to remind that the two conditions do occur together. To base the diagnosis of diverticulitis on the demonstration of a few diverticula in the vicinity of an otherwise questionable lesion is hazardous and may be disastrous for the patient.

Obstetrics, Gynecology Exams Set

Part II of the oral and clinical examinations for certification by the American Board of Obstetrics and Gynecology will be given in Chicago from May 8 to May 19. Current bulletins of the board outlining the requirements for application may be obtained by writing Dr. Robert L. Faulkner, 2105 Adelbert Road, Cleveland 6.

Hospitalized alcoholics do not have to want help to be improved, suggests an analysis of replies from families of patients discharged during the year ending August 31, 1957, and reported in the June-July *Spotlight on Alcoholism*, the newsletter of the Texas Commission on Alcoholism. Of the 268 patients reported as improved or much improved 6 months after discharge, 59 per cent were committed by the courts. In one of two wards which showed the highest apparent recovery percentage, 64 of 67 patients helped had been committed; in the other, 49 of 63 helped were voluntary patients.

Congenital Heart Disease In Infancy with Particular Reference to Its Surgical Implications

ENID F. GILBERT, M.B.B.S.
Austin, Texas

DURING THE LAST decade remarkable progress has been made in the development of operative procedures for the correction of congenital cardiac malformations. At the present time there are relatively few congenital heart defects which are not amenable to surgical correction or alleviation. It therefore becomes imperative to establish an accurate and definitive diagnosis early, since cardiac surgery may prove lifesaving.

Problems in the diagnosis of congenital heart disease during infancy should not be great if one is aware of the types of lesion which may present symptoms during this period. It is of prime importance, in the evaluation of an infant suspected of having a congenital cardiac defect, to obtain a detailed and accurate history. Of particular importance is the history of episodes of cerebral anoxemia and their exact nature, the time of onset of symptoms of congestive failure, the presence of feeding and respiratory difficulties, and the occurrence of respiratory infections.

In the examination of an infant from the cardiac standpoint, it is of importance to make definite observations. The character of the second heart sound and the presence or absence of a murmur, as well as its character, duration, and transmission, are essential. The character and distribution of cyanosis, if present, should be carefully observed with particular attention to whether it is frank cyanosis, which is characteristic of oxygen desaturation, or whether it is the pallid grayish type of cyanosis seen in infants with anoxemia. Important also is the character of the pulses, whether weak or forceful, and blood pres-

sure readings in all extremities using the flush technique. The presence of rales in the chest, peripheral edema, and liver enlargement also should be observed.

Laboratory investigations should include a complete blood count with hematocrit as well as electrocardiographic and roentgenologic examinations. An electrocardiogram using the standard limb leads, as well as precordial leads at half standardization, should be used. Fluoroscopic examination is useful in establishing the presence or absence of a pulmonary artery, its pulsations, and the vascularity of the lung fields. Roentgenograms will be helpful in the evaluation of chamber enlargement. Other special diagnostic investigations are usually not necessary, since approximately 80 per cent of congenital cardiac defects can be accurately diagnosed without resorting

Dr. Enid F. Gilbert, a diplomate of the American Board of Pediatrics, is at present in the department of pathology at Brackenridge Hospital, Austin.

Congenital cardiac malformations which manifest symptoms during infancy deserve complete evaluation and diagnosis so that surgical treatment can be carried out as indicated. Fourteen such lesions amenable to surgery are discussed.

to such procedures. No infant should be subjected to cardiac catheterization or angiocardiography unless there are clear-cut indications and then only if facilities are optimal, since these procedures have a definite operative risk. However, in selected instances important information can be obtained by these means. Retrograde aortography may be of definite value in differentiating a preductal from a postductal coarctation as well as establishing the presence of a patent ductus arteriosus in doubtful cases.

The operable types of congenital cardiac anomalies which become manifest in infancy and which usually require surgical treatment during this period include transposition of the great vessels, a large patent ductus arteriosus, vascular ring, preductal coarctation, single ventricle with transposition, complete anomalous pulmonary venous return, atrioventricularis communis, truncus arteriosus with absence of the pulmonary arteries, endocardial fibroelastosis, anomalous origin of the left coronary artery from the pulmonary artery, extreme tetralogy of Fallot, aortic and subaortic stenosis, and ventricular septal defect. Each of these conditions will be discussed briefly.

TRANSPOSITION OF GREAT VESSELS

In a transposition of the great vessels, the origins of the pulmonary artery and aorta are reversed, the former arising from the left ventricle and the latter from the right ventricle. A communication between the two circulations is always present in the form of a defect in the auricular or ventricular septum or a patent ductus arteriosus.

Cyanosis may be evident at birth or develop shortly thereafter. In the presence of a patent ductus arteriosus, the cyanosis may be more apparent in the upper than the lower extremities. Congestive failure occurs early in life, and it is predominantly left sided. Thus, it may be difficult to differentiate from a bronchopneumonia. The second heart sound is of normal intensity, and a systolic murmur is usually present, which, if loud, should arouse the suspicion of an associated ventricular septal defect or a pulmonic stenosis. The pulses and blood pressure readings are within normal limits. The characteristic radiographic appearance of transposition of the great vessels is a globular heart with narrowing of the shadow of the great vessels at the base. There is electrocardiographic evidence of right ventricular enlargement.

Infants with this type of cardiac malformation usually die within the first 3 months of life, so that surgical treatment is imperative as soon as the diagnosis is established. At the present time, the best palliative procedure is the creation of an atrial septal defect. However, a switchover operation of the great vessels carrying the left coronary artery with the aorta has the most promise for permanently correcting the defect.[14]

LARGE PATENT DUCTUS ARTERIOSUS

When a large patent ductus arteriosus is present, symptoms frequently become manifest during the first few months of life, owing to the large amount of blood which is shunted from the aorta into the pulmonary circuit.

The sudden onset of left-sided cardiac failure is frequently the first symptom. There is often a history of respiratory and feeding difficulties and retardation of growth and development. In patients less than 1 year of age a systolic murmur is more frequently heard than a continuous murmur, which may not be present until 18 months of age.[19] The second heart sound at the base is accentuated, and there is a wide amplitude of the peripheral pulse pressures. Roentgenograms of the chest reveal a large heart and congested lung fields, while fluoroscopic examination demonstrates the increased amplitude of the pulsations in the pulmonary arteries, aorta, and left ventricle. Electrocardiographic studies

may be normal or show evidence of left ventricular enlargement. Pulmonary insufficiency, secondary to a dilated pulmonary artery, should be suspected if right ventricular preponderance is present.[18]

Division or ligation of the ductus is best performed as soon as the diagnosis is made,[2] preferably before the age of 5 years. It has been shown that delaying the operation beyond the age of 5 years rapidly increases the hazard of the development of cardiac failure, pulmonary hypertension, endarteritis, and degenerative vascular changes.[3] It is of prime importance that surgical correction be performed before the child is critically ill and prior to the development of pulmonary hypertension. Closure of the ductus results in the immediate disappearance of the murmur, return of the heart size to within normal limits, and a rise of the diastolic blood pressure to normal levels. The rate of growth and development of the child is considerably diminished if surgery is postponed until late in childhood.

VASCULAR RING

Vascular rings which compress the trachea and esophagus usually are caused by a double aortic arch, or a right aortic arch with a left ligamentum arteriosum. Vascular anomalies of branches of the aortic arch are less frequently implicated.

The predominant symptom in infants with a vascular ring is stridor, which may be accompanied by difficulties in swallowing and feeding with head retraction. If the obstruction is of a severe degree, cyanosis may occur. Intercostal and supracostal retraction during respiration may be severe with loud inspiratory and expiratory stridor. Poor or irregular aeration of the lung fields may be seen in inspiratory films of the chest with hyperaeration on expiratory films. An esophagram will clearly demonstrate the vascular anomaly.[15]

Surgical division of the constricting vessel or displacement of an artery to provide room for the trachea and esophagus results in prompt relief of the symptomatology.

PREDUCTAL COARCTATION OF AORTA

A preductal coarctation of the aorta occurs proximal to the ductus arteriosus and distal to the origin of the left subclavian artery. It is usually a diffuse narrowing of the lumen of the aorta rather than the localized constriction characteristic of a postductal type of coarctation.

Congestive failure and respiratory difficulties occur early in life and rapidly progress in severity. When cyanosis is present, an associated defect is usually found which is present in about half of the cases of preductal coarctation.

On physical examination there is a rapid respiratory rate; the second heart sound is of normal intensity and a systolic murmur is sometimes heard. The femoral pulses may be palpable. However, the blood pressure readings in the lower extremities will always be at least 15 mm. lower than in the arms.[18] In the presence of a widely patent ductus arteriosus, there may be a differential cyanosis between the hands and feet, in the latter, the degree of cyanosis being more severe. Roentgenologic examination shows right ventricular enlargement with normal vascularity of the lung fields. There is electrocardiographic evidence of left ventricular enlargement shortly after birth.[20] When doubt exists as to the presence of a preductal coarctation of the aorta in an infant, an aortogram is frequently helpful in establishing the diagnosis.

Excision of a preductal coarctation is essential for the survival of these infants. It does carry a high mortality (up to 50 per cent in experienced hands[13]), however. With the aid of more recent methods of cardiac bypass, the operative risk undoubtedly will be greatly reduced in the future.

POSTDUCTAL COARCTATION

Symptoms of postductal coarctation usually do not become manifest during infancy unless the constriction is marked. The history and physical findings are similar to those of preductal coarctation, but to a less severe degree. The electrocardiogram may show right or left ventricular preponderance, or the tracing may be within normal limits.[13, 20] In patients less than 1 year of age a retrograde aortogram is helpful in differentiating between preductal and postductal coarctation.[13]

Medical treatment in the form of adequate digitalization usually will relieve the symptoms in the postductal type of coarctation.[10] Surgery often can be delayed until later in childhood. However, if conservative measures fail, surgical excision of the lesion should be performed at an earlier age.

SINGLE VENTRICLE WITH TRANSPOSITION

In one type of cardiac malformation there is a single ventricular cavity with a smaller rudimentary outlet chamber. There is transposition of the great vessels with a hypoplastic aorta arising from the rudimentary outlet chamber and a large pulmonary artery from the main ventricular cavity. Thus there

is a large volume of blood shunted through the pulmonary circuit.

The history is one of feeding and respiratory difficulties with poor growth and development. Cyanosis of a mild degree may be present. The blood pressure readings and the amplitude of the pulse are normal. The second heart sound may be slightly accentuated, and a systolic murmur is usually heard. Of much help in the diagnosis of this condition is the roentgenological examination. The heart is enlarged in the anteroposterior position and flattened in the left anterior oblique position.[17] Right axis deviation and right ventricular preponderance are evident in the electrocardiogram. Angiocardiography may be helpful in demonstrating the common ventricle.

As a palliative procedure, a pulmonary tuck operation[12] is helpful. The creation of a ventricular septum has been attempted.[5]

In those patients in whom there is a single ventricle with transposition and pulmonary stenosis, a shunt between the superior vena cava and the distal end of the right pulmonary artery recently has been performed successfully.

COMPLETE ANOMALOUS PULMONARY VENOUS RETURN

When all pulmonary veins drain into the right auricle, there is a complete anomalous pulmonary venous return with marked enlargement of the right auricle. Because of the high pressure in the right auricle, the foramen ovale is kept open, and therefore communication between the right and left sides of the heart is maintained.

Cyanosis may be evident only when the infant cries or during exertion. Respiratory and feeding difficulties are frequent symptoms, and cardiac failure occurs early in life.

The physical findings are those of a decreased cardiac output. The pulses are weak. The respiratory rate is increased, and the blood pressure is usually low. A systolic murmur along the left sternal border is sometimes heard. Roentgenograms of the chest show marked right auricular enlargement with severe pulmonary congestion. Right ventricular enlargement is apparent in the electrocardiogram, with the presence of a Q wave in the right precordial leads.

An anastomosis of the common vessel into which all the pulmonary veins drain and the left auricle has been performed successfully in infants with this type of anomaly.[11] If the pulmonary veins drain separately into the right auricle, the auricular septal defect should be enlarged as a temporary procedure with corrective surgery at a later time.[18]

ATRIOVENTRICULARIS COMMUNIS

A free communication is present between all four chambers of the heart when there is a common atrioventricular valve.

Infants with atrioventricularis communis develop left-sided cardiac failure early in life together with feeding and respiratory difficulties. Cyanosis is usually minimal, but may become evident when the infant cries. The pulse is sometimes diminished, and the second heart sound is accentuated. A systolic murmur may or may not be heard. Due to the presence of a hypoplastic aorta, roentgenograms show narrowing of the great vessel shadow at the base of the heart.[18] There is generalized cardiac enlargement and increased vascularity of the lung fields. The electrocardiogram is most helpful in making the diagnosis of atrioventricularis communis and is usually diagnostic. The characteristic finding is a left axis deviation in the standard limb leads with right or combined ventricular preponderance in the precordial leads.[6]

This defect should be closed, using open heart surgery with the aid of the pump oxygenator. A piece of polyvinyl (Ivalon) sponge is used in repair of this defect. However, the large posterior margin of the defect should not be closed because of interference with the conduction mechanism of the heart.[18]

TRUNCUS ARTERIOSUS WITH ABSENCE OF PULMONARY ARTERIES

In truncus arteriosus with absence of pulmonary arteries a common trunk overrides a ventricular septum and thus receives blood from both ventricles. In the absence of the pulmonary arteries the circulation to the lungs is by way of the bronchial arteries. An atrial septal defect is a commonly associated defect.

At birth infants with this malformation are intensely cyanotic since the only blood supply to the lungs is through the bronchial arteries. Respiratory distress and symptoms of cerebral anoxemia are usually evident at or shortly after birth.

Physical examination reveals an intensely cyanotic infant. The pulse is full and the second heart sound is clear, pure, and sharp. A systolic murmur may be heard, and frequently a continuous murmur may be audible because of the large collateral bronchial arteries. This is one of the few congenital cardiac malformations in which there is usually definite cardiac enlargement present at birth.[18] The roentgenographic appearance of the heart in the left anterior oblique position has a characteristic contour. There is widening of the vascular shadow at the base which makes a sharp angle with the heart due to the absence of

the pulmonary artery.[17] The electrocardiogram reveals right ventricular preponderance.

A pleurectomy has been used in order to attempt to increase the blood supply to the lungs with good results in at least 1 case[8] and would appear at the present time to be a worth-while procedure.

ENDOCARDIAL FIBROELASTOSIS

Endocardial fibroelastosis is characterized by thickening of the endocardium, particularly of the left ventricle, by fibrosis and elastic tissue.

Symptoms associated with this defect are cough, respiratory difficulty, failure to gain weight, and a sudden onset of congestive cardiac failure with progressive cardiac enlargement.

Physical findings include a tachycardia with normal or decreased amplitude of the pulses, a minimal degree of grayish cyanosis, and the occasional presence of a faint systolic murmur. Signs of left-sided cardiac failure are also evident. Roentgen-ray examination reveals generalized cardiac enlargement, particularly involving the left ventricle, and the electrocardiogram shows left ventricular preponderance with inversion of T_{4-6} waves.

Cardiac poudrage by the instillation of talc into the pericardium by increasing the vascularization of the left ventricle has proven helpful in these infants.[16] Because of the imminent danger of producing a pericarditis by this method, an anastomosis between the lung and the heart appears to be preferable.[7]

ANOMALOUS ORIGIN OF LEFT CORONARY ARTERY FROM PULMONARY ARTERY

If the left coronary artery arises from the pulmonary artery, there is poor oxygenation of the left ventricle with resulting myocardial ischemia. The apex of the heart may become thin, and aneurysmal dilatation is not infrequently found.

The symptoms of this anomaly usually become manifest within the first 2 months of life and are similar to those of endocardial fibroelastosis. However, infants with an anomalous origin of the left coronary artery from the pulmonary artery have characteristic anginal attacks of coronary insufficiency. By observing one of these episodes the diagnosis of this condition can be made. With the sudden onset of pain, the infant cries, the skin becomes ashen, the respirations become rapid, and there is a profuse perspiration. Hypertrophy of the left ventricle is apparent in roentgenograms of the chest, and left ventricular preponderance with low voltage and inversion of the T waves is seen on the electrocardiogram.

In infants with this anomaly the same procedures for increasing the vascularization of the left ventricle should be attempted as those previously mentioned for endocardial fibroelastosis.

EXTREME TETRALOGY OF FALLOT

In extreme tetralogy of Fallot a ventricular septal defect with an overriding aorta and hypertrophy of the right ventricle is associated with an extreme stenosis or atresia of the pulmonary artery. There also may be a marked degree of dextroposition of the aorta.

Because of the poor circulation to the lungs, cyanosis, which is of a moderate degree at birth, gradually becomes more marked. The respiratory rate is rapid, and the infant may have severe episodes of cerebral anoxemia. Clubbing of the fingers and toes usually becomes noticeable by 6 months of age. The blood pressure may be difficult to obtain; however, the pulse is usually of normal amplitude. The second heart sound at the base is frequently normal or may be diminished in intensity. If there is pulmonary atresia, or the stenosis is extreme, no murmur is heard. If pulmonary atresia is present, roentgenograms of the heart show a characteristic contour which resembles that seen in cases of patent ductus arteriosus. If stenosis is marked, the apex is tipped up and there is a concavity in the region of the pulmonary segment. The pulmonary vascular markings are strikingly decreased. There is evidence of both right auricular and ventricular enlargement in the electrocardiogram. Angiocardiography is not necessary to make a diagnosis, and cardiac catheterization should not be done, since this is an extremely hazardous procedure in these cases. A catheter entering a markedly stenotic pulmonary artery may cause sudden death of the infant.

If the symptoms are severe, an anastomosis between the pulmonary artery and the left subclavian artery (Blalock-Taussig anastomosis) or between the pulmonary artery and the aorta (Pott's procedure) should be performed, the latter being preferable in an infant. However, corrective intracardiac procedures have been successfully attempted in young patients without an initial shunt operation.

AORTIC AND SUBAORTIC STENOSIS

Fusion of the valve leaflets or the presence of a muscular or fibrous band beneath the aortic valve are the defects giving rise to aortic and subaortic stenosis respectively.

Unless the stenosis is severe, symptoms usually do not appear until childhood. However, when the aorta is markedly stenotic, symptoms of coronary insufficiency may occur early in life with left-sided congestive failure. Cyanosis is not present.

The physical findings are those of diminished cardiac output. The peripheral pulses are poor, there are low systolic and diastolic blood pressures, and the intensity of the second heart sound is diminished. A well defined loud harsh systolic murmur is always heard with maximal intensity over the aortic area and transmission to the large vessels of the neck. The murmur is usually accompanied by a thrill palpable over the base of the heart.

Fluoroscopic and roentgen-ray examinations reveal marked left ventricular hypertrophy, and the electrocardiogram shows a left ventricular preponderance with inversion of the T waves in lead 1 and the left precordial leads.

An infant with this anomaly who develops symptoms of congestive failure with marked inversion of the T waves should have the benefit of surgical treatment. A direct approach to the aortic valve seems most feasible and has proved more successful than the blind procedures.

VENTRICULAR SEPTAL DEFECT

The defect of the ventricular septum which is most commonly encountered is that involving the membranous portion of the septum directly beneath the aortic and tricuspid valves. Rarely it may involve the muscular portion of the ventricular septum.

Depending on the severity of this lesion, the child may develop symptoms early in life. Fleeting episodes of cyanosis are seen occasionally. Feeding and respiratory difficulties may be present, which are frequently precursors of congestive failure.

The peripheral pulses and blood pressure readings are normal. The second heart sound may be increased, and a murmur of moderate intensity is usually heard along the left sternal border. Evidence of left or combined ventricular hypertrophy is seen both by roentgen-ray and electrocardiographic examinations. The diagnosis of this condition is frequently difficult, since not only does it have no specific characteristic distinguishing features, but there are usually associated defects, most often in the form of either an atrial septal defect or a patent ductus arteriosus. Cardiac catheterization is frequently necessary to confirm the diagnosis. However, angiocardiography is usually not helpful.

Patients who develop symptoms in early life usually respond to conservative medical treatment. However, should this fail, open heart surgery may be considered. As in any lesion in which there is an excessive blood flow to the lungs such as occurs in a large ventricular septal defect, the pulmonary tuck operation is an excellent palliative procedure.[12] This may tide the infant over until more definitive surgery can be attempted. Complete intracardiac repair of the defect can now be performed successfully.

CONCLUSION

Great strides have been made in the surgical treatment of infants with congenital malformations of the heart. Recent investigations have revealed that 90 per cent of patients with congenital heart disease develop symptoms of congestive failure before the age of 1 year.[9] It, therefore, is essential that every infant with a congenital malformation of the heart should have a complete cardiac evaluation, since it is of paramount importance to make a definitive diagnosis because cardiac surgery early in life may prove lifesaving and reduce needless morbidity and mortality. In many instances by a delay in surgery certain operable lesions may reach the stage of inoperability.[1] There also appears to be a greater potential for the return of the cardiac status toward the normal when surgery for a congenital malformation of the heart is performed at an early age. Few lesions are of such a bizarre and complicated nature that corrective or palliative surgical procedures may not be attempted at the present time. In many instances these operations carry a high mortality rate. However, infants who otherwise would die early in life should be given the chance of survival. With the introduction of the mechanical pump oxygenator,[4] open heart surgery is not only possible, but affords a direct approach to correction of intracardiac defects. It is not unreasonable to predict that in the not too distant future, the most complicated of cardiac defects may be amenable to surgical correction.

SUMMARY

Congenital cardiac malformations which manifest symptoms during infancy and which are at present amenable to surgical treatment have been discussed. These lesions include transposition of the great vessels, a large patent ductus arteriosus, vascular ring, preductal coarctation, postductal coarctation, single ventricle with transposition, complete anomalous pulmonary venous return, atrioventricularis communis, truncus arteriosus with absence of the pulmonary arteries, endocardial fibroelastosis, anomalous origin of the left coronary artery from the pulmonary artery, extreme tetralogy of Fallot, aortic and subaortic stenosis, and ventricular septal defect.

The essential features in the history and cardiac examination of infants have been discussed. It has been emphasized that a complete cardiac evaluation should be made and a definitive diagnosis established in each case, since this is of prime consideration for the survival of infants with congenital heart anomalies which can be treated surgically.

ACKNOWLEDGMENT

Many of the comments in this paper have been formulated in previous discussions and publications with Dr. Bernice G. Wedum. The author wishes to express deep gratitude to her for thus enabling, in large part, the present review.

REFERENCES

1. Adams, F. H.: Early Definitive Diagnosis of Patients with Congenital Heart Disease, J. Pediat. 51:202-206 (Aug.) 1957.
2. Ash, R., and Fischer, D.: Manifestations and Results of Treatment of Patent Ductus Arteriosus in Infancy and Childhood; Analysis of 138 Cases, Pediatrics 16:695-703 (Nov.) 1955.
3. Clatworthy, H. W., Jr., and McDonald, V. G., Jr.: Optimum Age for Surgical Closure of Patent Ductus Arteriosus, J.A.M.A. 167:444-448 (May 24) 1958.
4. DeWall, R. A.; Warden, H. E.; Gott, V. L.; Read, R. C.; Varco, R. L.; and Lillehei, C. W.: Total Body Perfusion for Open Cardiotomy Utilizing Bubble Oxygenator; Physiologic Responses in Man, J. Thoracic Surg. 32:591-603 (Nov.) 1956.
5. Dushane, J. W.: Personal communication, cited by Wedum, B. G., and Gilbert, E. F.: Operable Congenital Malformations of Heart; Congenital Malformations in Neonatal Period and Infancy, M. Ann. District of Columbia 26:223-233 (May) 1957.
6. Friedman, S., and Ash, R.: Persistent Common Atrioventricular Canal; Clinical and Pathologic Observations in 12 Infants, A.M.A. Am. J. Dis. Child. 93:619-628 (June) 1957.
7. Garamella, J. J.; Hay, L. J.; George, V. P.; and Jensen, N. K.: Modified Cardiopneumopexy Employing Segmental Resection; Experimental Method with Directional Flow Studies, Surgery 39:574-591 (April) 1956.
8. Johnson, J., and Ash, R.: Unpublished data, cited by Wedum, B. G., and Gilbert, E. F.: Operable Congenital Malformations of Heart; Congenital Malformations in Neonatal Period and Infancy, M. Ann. District of Columbia 26:223-233 (May) 1957.
9. Keith, J. D.: Congestive Heart Failure, Pediatrics 18:491-500 (Sept.) 1956.
10. Lang, H. T., Jr., and Nadas, A. S.: Coarctation of Aorta with Congestive Heart Failure in Infancy—Medical Treatment, Pediatrics 17:45-57 (Jan.) 1956.
11. Muller, W. H., Jr.: Surgical Treatment of Transposition of Pulmonary Veins, Ann. Surg. 134:683-693 (Oct.) 1951.
12. Muller, W. H., Jr., and Dammann, J. F., Jr.: Treatment of Certain Congenital Malformations of Heart by Creation of Pulmonic Stenosis to Reduce Pulmonary Hypertension and Excessive Pulmonary Blood Flow; Preliminary Report, Surg., Gynec., & Obst. 95:213-219 (Aug.) 1952.
13. Mustard, W. T.; Rowe, R. D.; Keith, J. D.; and Sirek, A.: Coarctation of Aorta with Special Reference to First Year of Life, Ann. Surg. 141:429-436 (April) 1955.
14. Mustard, W. T., and others: Surgical Approach to Transposition of Great Vessels with Extracorporeal Circuit, Surgery 36:39-51 (July) 1954.
15. Neuhauser, E. B. D.: Tracheo-Esophageal Constriction Produced by Right Aortic Arch and Left Ligamentum Arteriosum, Am. J. Roentgenol. 62:493-499 (Oct.) 1949.
16. Paul, R. N., and Robbins, S. G.: Surgical Treatment Proposed for Either Endocardial Fibroelastosis or Anomalous Left Coronary Artery, Pediatrics 16:147-163 (Aug.) 1955.
17. Taussig, H. B.: Congenital Malformations of Heart, Commonwealth Fund, London, Oxford University Press, 1947.
18. Wedum, B. G.: Differential Diagnosis of Congenital Heart Disease in Infancy, J.A.M.A. 165:651-657 (Oct. 12) 1957.
19. Ziegler, R. F.: Importance of Parent Ductus Arteriosus in Infants, Am. Heart J. 43:553-572 (April) 1952.
20. Ziegler, R. F.: Genesis and Importance of Electrocardiogram in Coarctation of Aorta, Circulation 9:371-380 (March) 1954.

Dr. Gilbert, 1310 Westmoor Drive, Austin 5.

Investigation Of Suicide

ROBERT HAUSMAN, M.D.

San Antonio, Texas

AT LEAST ONE person takes his own life every half hour around the clock in the United States. The figure of 16,000 deaths by suicide registered in 1956 is probably conservative, since many suicides are concealed or passed off as natural deaths or accidental deaths. Even so, suicide ranks ninth as cause of death in the United States. The concerted campaigns against diseases which are major causes of death undoubtedly will result in suicide becoming more prominent in the list. The advent of the medical examiner system, which is conducive of a thorough investigation of violent deaths, will add to the number of cases of suicide that are reported annually. Finally, the fact that suicide is relatively more common in old age will cause an increased suicide rate as the age of the population increases.

Dr. Robert Hausman is medical examiner for Bexar County.

Suicide ranks ninth as a cause of death in the United States. A physician called on even occasionally to assist in investigation of suicide by firearms, hanging and strangulation, drowning, drugs and chemicals, sharp cutting instruments, or fire can learn certain procedures of value in reaching a correct verdict.

As yet there is no organized public interest in suicide and no wide campaigns have been waged against it. Prevention of suicide appears more feasible with more immediate benefits than prevention of many of the diseases that are being attacked by popular demand.

In English common law suicide is a crime against society, though at present the age-old sanctions against the body and property of the suicide have been removed. England and a few states of the United States are the only places in the world where an attempt at suicide is still regarded as a felony for which the maximum penalty is 2 years' imprisonment. In Texas suicide or attempted suicide is not

regarded as a crime, but it still does carry the sociological onus of a contemptible or forbidden action. The stigma that suicide carries explains the almost complete lack of research and prevention of this important mental health problem. Adequate investigation of suicide, which is the basis for research and prevention, rightfully belongs in the hands of physicians.

Since suicide is a form of violent death it always becomes a matter of concern to the law enforcement agencies. The forensic pathologist through specialized training is of course best suited to investigate the medical aspects of suicide, but any general practitioner or specialist who is interested in medicolegal problems, with little additional study and a generous application of common sense, could become proficient at investigating suicides. As a matter of fact, the very training of a physician qualifies him with the mind of a detective, and this, combined with his knowledge of human anatomy and mental and physical processes, makes him better suited to the role than the average police investigator.

The policeman confronted with an obvious or apparent suicide is slightly repulsed by the gore and the grotesque attitude of the dead body and somewhat mystified and annoyed by the implied motives and thought processes which led to the suicide. He is also aware of the fact that he will have to answer many searching questions from relatives and disbelieving friends. Possibilities of accidental death or foul play have to be considered and eliminated as a matter of routine even though further investigation appears to be a waste of time. As the chief of police once remarked, "Suicide used to be the headache of the homicide detail."

Since the inception of the medical examiner system in Bexar County, questions regarding suicides by relatives and interested parties are automatically referred to the medical examiner's office in San Antonio. The records show that there is not a suicide, no matter how obvious in planning and execution, which will escape a doubt expressed by the relatives as to the possibility of foul play or accident. The following case serves to show to what length relatives will go in trying to reverse a verdict of suicide.

A young man given to impulsive actions had a spat with his wife and then ostensibly readied gun cleaning equipment on a table in his bedroom at 2 a.m. His wife, who had joined her mother in an adjacent bedroom, heard a shot. She found her husband slumped against the bed with a bullet wound in the head. He died 3 hours later. The bullet had entered the right temple where a clear impression of the muzzle of the gun was visible and had produced an exit wound in the left upper parietal region. A verdict of suicide was rendered.

A few days later there descended on the medical examiner's office the widow, accompanied by her father-in-law, a justice of the peace, and the district attorney of the county from which the young man hailed. After an exchange of pleasantries and social amenities ("Nobody is infallible." "As a justice of the peace I have had an opportunity to investigate many cases of suicides as well as homicides . . .") it was proposed in all seriousness that the fatal happening might have been an accident. It was postulated that the deceased while in the process of cleaning the gun had held the weapon in his right hand along the right side of his head pointing the barrel pensively upward. It was further postulated that the deceased at that time suffered a dizzy spell causing him to fall on the muzzle of the gun, which, having the ubiquitous "hair trigger," discharged and thus accidentally produced the fatal wound. After a few less likely possibilities had been mentioned, the wife, who better than anyone else was able to fathom the mental processes of her deceased husband, graciously lifted the siege from the medical examiner.

It is understandable that anyone who becomes involved in the investigation of suicide has to be able to prove his deductions and to think carefully of all possibilities including the very remote ones. To the initiated a thorough investigation of suicide gives the satisfaction of meeting a challenge and conquering it. It also means fulfilling an obligation to the community and making a contribution toward the mental health of our society.

It is almost imperative that the investigating physician start his examination at the scene. Frequently there are vital clues to the fatal happening which may be lost when the body is moved.

A middle aged woman took an early morning walk in her neighborhood. Shortly thereafter her body was found floating in a private swimming pool. Suicide was immediately apparent from the carefully folded spectacles which she had laid on the edge of the pool.

A man was found shot in a field. The body rested face down on a shotgun. As it was turned a slender 10 inch stick fell from between his left index and middle finger. From the position it was clear that the stick had been used to push the trigger.

Law enforcement officers can be brought easily to the understanding that the investigation of suicide, and for that matter of any violent or suspicious death, is a joint undertaking. They will refrain from disturbing the body or the scene until everyone is present. The physician likewise should make it a point not to start until the officers of the homicide detail are present and the necessary photographs have been taken. His examination should be thorough and unhurried. Frequent consultation with the officers concerning obscure details is extremely helpful. Experienced homicide officers have a habit of quietly collecting background information from neighbors, friends, and relatives of the victim. In the majority of cases they have this background information at hand by the time the physician arrives.

Suicide notes are the most important evidence that a deliberate intent of self destruction existed, and they should be carefully preserved. The possibility of a planted or fake note should be kept in mind. It

often can be eliminated on the spot by comparison with samples of handwriting of the victim. Although instructions contained in suicide notes have no legal standing, it is customary for the relatives to abide by them. The family frequently will request the notes and the physician may release a copy but should retain the original for the files. Legally the coroner or justice of the peace will have to take possession of the suicide notes. The physician, however, should discuss the desirability of regarding these notes as privileged communication and request that he be entrusted with their care. The contents of a suicide note should not be divulged to the newspapers. All other factual details of a suicide investigation may be released by the investigating physician to the newspaper reporters.

Notes are left in only 15 per cent of suicides. Even when a suicide note is found, the medical investigation cannot be neglected and should be as detailed and thorough as if no notes had been found.

A young man entrusted with the maintenance of military equipment including gasoline generators was found dead in a store room. He held a revolver clutched in his right hand, and a photograph of a girl with a suicide message on the back was found on a table nearby. The ignition switch of one of the generators was in the "on" position, and the cause of death proved to be asphyxiation by carbon monoxide. Further investigation showed that the young man was in the habit of testing the generators regularly each evening for a few minutes. It was questionable whether he realized the danger of running the generators in a partially closed room for a prolonged period of time. No evidence existed that he intended to commit suicide with carbon monoxide. For these reasons a verdict was returned of "accidental death while contemplating suicide."

Suicides are often committed while the victim is under the influence of alcohol. To know the ethyl alcohol concentration of the blood thus frequently becomes essential for the investigative procedures. When no local facilities for analysis exist, a sample of blood should be collected and saved in chemically clean glassware. Contamination by even traces of formalin should be avoided. Although alcohol levels can be determined from 1 cc., at least 5 cc. and preferably 10 cc. should be withdrawn. Since diffusion of alcohol through the stomach wall after death may elevate the heart's blood level, the blood should be removed from the femoral vessels. The addition of 100 mg. of sodium fluoride per 5 cc. will preserve the blood indefinitely.

Almost any handbook of medical jurisprudence or forensic medicine will give a comprehensive discussion of the medical aspects of the investigation of suicide. For the practicing physician who is called upon to assist the sheriff or the police department in an occasional case of apparent suicide it might be well to highlight some of the salient points of the various types of suicide.

FIREARMS

In Bexar County and probably in all of Texas suicide with firearms comprises a little more than 50 per cent of all suicides. Revolvers, pistols, and rifles are about equally popular. It is astounding that even in institutions where gunshot wounds are treated regularly many physicians are unable to distinguish between entrance and exit wounds.

Careful examination of the entrance wound is the single most important procedure in the investigation of suicide by firearms. A bullet entrance wound has a central small irregular perforation surrounded by a ring of blackening, soiling, and abrasion also called the contusion ring or bullet contact ring. The outlines of this ring are either round or oval depending on the angle at which the bullet penetrated the skin. Its smallest diameter denotes the caliber of the bullet, but no reliance should be placed on this rule. The recovery of the bullet is the only sure method of determining its caliber. Surrounding the bullet contusion ring is frequently a subcutaneous hemorrhage which shines blue or purple through the skin. Its presence is of no importance, and this blue or purple discoloration should not be confused with a zone of abrasion which surrounds the contusion ring completely or partially and which represents the impression of the gun muzzle (fig. 1). The sight of the gun or the nozzle of the recoil spring rod on occasion may leave a clear impression even when it is recessed from the level of the muzzle rim (fig. 2). The reason for this is that in close contact wounds the exploding gases leaving the muzzle will hit the

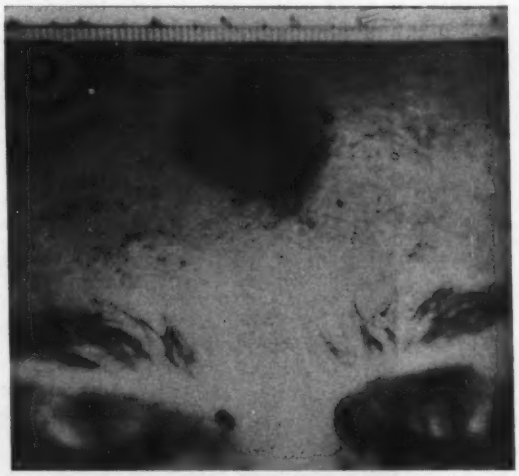


Fig. 1. The bullet contusion ring is surrounded along the upper border by a concentric abrasion caused by the muzzle. A few punctate burns by powder particles surround the wound. The bilateral hematomas of the upper lids are a common sequel and associated with fractures of the orbital roofs.

subcutaneous barrier of bone surrounding the bullet hole in the skull or a rib. The gases will cause the skin to bulge and to be forcibly stretched and pressed or slapped against the end of the weapon. Quite frequently the skin will split open in a stellate fashion and give the wound the appearance of a lacerated exit wound. In such a case the contusion ring and the muzzle impression should be searched for along the edges of the laceration. The small bore weapons, as for instance a .22 pistol, do not always produce this explosive discharge. It may be necessary to resort to careful dissection of the entrance wound in order to find blackening of the edges of the wound in the skull or in the dura mater by the powder blast.

When the ammunition contains black powder, as for instance in shotgun shells, there may be considerable powder smudging and scorching. In close contact wounds of revolvers, pistols, or rifles this smudging is usually minimal or absent. Powder burning, which should be distinguished from powder smudging and scorching, consists of small particles or grains of burning powder being driven into the skin leaving punctate black or dark red marks scattered in an area of a few centimeters diameter. Their presence indicates that the gun was fired at some distance from the skin (fig. 3). They may occur in suicide under special circumstances.

A man tied a rifle to a table leg with a loop around the trigger. Sitting before the table he pressed the muzzle with both hands against his forehead. He subsequently pulled his head back and followed this movement with his hands. From the powder burns it was estimated that the gun discharged at a distance of 3 cm. from the skin.

A close contact wound is indicative of suicide and in most cases may be used as evidence to return a verdict of suicide. Of course, the accessibility of the site, right or lefthandedness of the deceased, whether the site was bared prior to the shooting, and all other details should be taken into account.

The examination of the weapon is an integral part of the investigation and can best be left to the ballistics expert. Because of frequent reference to "hair trigger," the expert should determine the pressure necessary to pull the trigger. He also should test the gun by jarring while it is cocked. Defects in a gun should be carefully evaluated.

A bartender was brandishing a gun ostensibly to kill rats. When one of his customers expressed anxiety at these antics, he demonstrated the "double safety catch" and proceeded to test them while pressing the gun against his temple. Subsequent investigation showed both catches to be defective and a verdict of "accidental death" was returned.

The examination of bullet perforations of clothes in suicidal shooting usually does not add to the investigation. Whenever necessary, the clothing should be preserved and not disposed of until the suicide has been definitely established.

HANGING AND STRANGULATION

Hanging and strangulation by their very nature leave little doubt as to the deliberate intent to self destruction. There are, however, two situations which are exceptions to this rule. Children at play occasionally will try hanging and not be aware of the dangers involved. It has been determined experimentally

Fig. 2. The nozzle of the recoil spring rod produced a perforation underneath the stellate bullet entrance wound. This indicates close contact of the gun muzzle. Notice the discoloration surrounding the wounds due to subcutaneous hemorrhage. (Left picture courtesy of Brooke Army Hospital Department of Photography. Right picture courtesy of San Antonio City Police Laboratory.)

that if a person is suspended by the neck with the rope above the thyroid cartilage, unconsciousness may set in after 1 to 1½ minutes and death may be delayed accordingly. If the rope is looped below the cricoid cartilage, unconsciousness may develop in a matter of seconds and death occur very rapidly.

A 12 year old boy was watching a television program named "Money." It depicted a detective gone astray who strangled a woman with a tie. At the conclusion of the program he went to his bedroom preparing to retire for the night. Shortly thereafter his sister discovered his body in the closet suspended from a clothes rack by a tie.

A classmate of the unfortunate victim just described commented at the funeral how brave he thought his friend had been. He expressed doubt as to whether he would have the courage to try hanging. That same evening his body was found suspended by an open looped handkerchief which was tied to the latch of a low transom window in the bathroom.

The verdict in both cases was "accidental death."

Fig. 3. Powder stippling surrounding a .22 rifle wound. The muzzle was held in the left hand 1 to 2 inches from the chest. The weapon rested on a brick wall while the trigger was discharged with a stick.

A similar situation exists where adolescent males are accidentally asphyxiated while engaged in autoerotic activities. The pattern of these deaths apparently is known to forensic pathologists only.

A 17 year old boy with slightly below average intelligence was left alone at home watching television. About 15 minutes later his body was discovered hanging from the edge of a door. It had a belt looped around the neck with the feet touching the ground and knees slightly bent. The penis in semi-rigid condition protruded from the open fly. There was no evidence of an ejaculation. The verdict was "accidental death while experimenting."

That autoerotic activities may accompany undeniable suicide is demonstrated by the following case.

A 14 year old boy was found dead in bed 3 weeks after the marriage of his older sister. He was attired in one of his sister's dresses, which was pulled up around his middle leaving his nude abdomen and genitals exposed. A plastic bag covering the head was tied around the neck and the end of a hose from the open gas jet.

The possibility of concealment of homicide by hanging a dead body should always be kept in mind. *Careful examination of the strangulation groove with a magnifying glass is the most important procedure in suicide by hanging or strangulation.* Small hemorrhages, blisters, and hyperemic zones in and around the grooves are proof that hanging occurred during life, but these signs on occasion may be absent. Congestion of the face with conjunctival hemorrhages and dependent lividity with the presence of small postmortem suggillations along the legs (Tardieu spots) may be indicative of intravital hanging, but are no proof of it. If no satisfactory outward signs exist, an autopsy should be performed. Laryngeal hemorrhages and pharyngeal congestion with bruising of the soft tissues of the neck may clinch the diagnosis of suicide, but unfortunately are not always present. The height at which a body is suspended is irrelevant for the investigation since suicidal hanging in a prone position with the head a few inches off the ground is entirely possible.

In cases of self strangulation the cord or cloth frequently is wound tightly around the neck with 2 or more turns and the ends tied in several knots.

A middle aged woman with a history of institutional care for alcoholism was found collapsed in front of a mirror in her bedroom. Artificial respiration was given by the fire department and maintained in the ambulance during the ride to the hospital. It was only in the emergency room that a tightly knotted silk scarf was found around the neck concealed by the chin and hair.

Preservation of the rope with the original knots may be indicated for further police investigation.

DROWNING

The scientific proof of drowning by the examination of a body is difficult. The chemical tests which intend to show dilution of the left atrial blood by water in practice turn out to be unsatisfactory. Differences in sodium, potassium, chloride, and magnesium content of blood from the right and the left atrium are cumbersome to determine and not sufficiently constant to warrant the determination in an occasional case of drowning. Most reliable is the difference in specific gravity of the plasma of right and left atrial blood, but caution should be used in the interpretation of the results. In both fresh water and salt water drowning the specific gravity of the

left atrium is lower. Weeds, water plants, or river bottom mud clenched in a fist may be a better indication of drowning than the postmortem findings. Definite indications of suicide usually are lacking, and in the absence of witnesses a postmortem examination is imperative to establish the absence of homicidal injuries.

A few facts concerning drowning should be kept in mind. Suicidal drowning in a bucket of water is possible.

A man attempted suicide by slashing wrists and neck with a knife. He managed to open his trachea but did not injure any major blood vessels. He subsequently laid face down in a shallow ditch and sucked water and mud through his tracheostomy. A large quantity of mud was also found in the stomach.

Drowning in fresh water is a rapid process with death from ventricular fibrillation following potassium release from erythrocytes in massive hemolysis. In rivers bodies will sink to the bottom where there is little current, and therefore they can be found close to the spot where the drowning occurred. Neatly folded clothes on the water edge and heavy weights tied to the body are indicative of suicide. In most cases in which a deliberate intent of suicide cannot be demonstrated a verdict of accidental drowning is in order.

DRUGS AND CHEMICALS

Deaths resulting from drugs and chemicals may be among the easiest to investigate and also may be among the most baffling to clear. The presence of empty bottles, glasses, and medicine boxes near the body are considered strong indications of suicide, but in practice this rule is difficult to apply. In most cases where such indications exist death is due to natural causes, to untoward reactions to medicine, or to accidental overdose. A suicide may leave the medicine container nearby; but just as frequently it may be somewhere else, and a careful search of the premises is therefore indicated. A chemical analysis of stomach contents and tissues is usually required, but difficult to obtain in a satisfactory manner. A close consultation between the investigating physician and the toxicologist is absolutely necessary for best results, but in practice can seldom be arranged.

The occupation of the victim on occasion may give rise to suspicion of suicide. Exterminators, jewelers, photographers, pharmacists, and chemists have unlimited access to potent toxic substances.

The body of an old man was found slumped on the grave of his wife, whose death had preceded his by 6 months. He was identified as a jeweler, and his stomach contents had an overpowering odor of bitter almonds. A piece of filter paper serially impregnated with freshly prepared 10 per cent alcoholic guaiac solution and 0.1 per cent aqueous copper sulfate solution and subsequently dried turned blue rapidly when suspended over the stomach contents. This quick test indicated cyanide and was confirmed by more elaborate chemical examination.

The amount of the offending chemical ingested by the victim should be calculated from the analysis of the postmortem material since it frequently will determine the suicidal nature of the death.

It should be remembered that adequate toxicological investigation can be done only if all of the stomach contents, all of the urine, 500 cc. of blood, 500 Gm. of liver, 500 Gm. of brain, and both kidneys are preserved in the freezer and the request for analysis specifies which group or groups of toxic substances are suspected in any given case. Even in the face of unsatisfactory toxicological investigation the assumption of death from drugs is possible.

A young woman who had threatened suicide was found dead in bed the same day. All medicine bottles were collected, and one empty bottle was found which had contained 12 antihistamine pills. The postmortem examination did not uncover the cause of death, and analysis of tissues was negative for the medicines found in the home. In the stomach the 12 missing tablets were found partially dissolved. The amount of antihistaminic absorbed could not account for the death, but a verdict of "probable suicide" was returned.

SHARP CUTTING INSTRUMENTS

In spite of the unlimited number of knives and razor blades that are available, suicide with these instruments is relatively rare. Suicidal cut wounds are indicated by the favored sites (wrists and neck) and by their repetitive or tentative pattern. This pattern is characterized by the so-called hesitation marks, which may be numerous and which consist of nearly parallel superficial cuts. These cuts are administered

Fig. 4. The hesitation marks are bilateral and range from the middle of the lower arm to the middle of the upper arm. The left brachial artery was severed. Notice the futile superficial slashes over the breast.

before as well as after the deep deliberate slashes (fig. 4).

A middle aged woman was found with her face near an open gas jet on the floor. A razor blade was clenched in the right hand, and there were 62 hesitation marks over both breasts and in both antecubital fossas. One deep cut had severed the brachial artery and death was by exsanguination.

The repetitive or tentative pattern is also seen in suicide by stabbing in which the upper part of abdomen, precordial area, and neck appear to be the favored sites (fig. 5).

Stab wounds with a single edged blade are an elongated oval with one sharp point and a notch at the opposite edge. A thin scratch extending from the point indicates the direction in which the knife is withdrawn (fig. 6). Incised wounds inflicted by a right handed person extend from left to right with slightly upward slope and greatest depth on the left side. Bruising around a stab wound indicates the hilt of the knife.

A careful examination of the body should include the hands to eliminate the presence of defense wounds.

FIRE

Suicide by fire is usually indicative of a deranged mind.

Fig. 5. The suicidal stab wounds are arranged in groups. Three are in the upper abdomen, three in the region of the heart, and two in the base of the neck. The right subclavian artery was severed.

A woman recently discharged from a mental institution with a diagnosis of schizophrenia poured gasoline over her clothes and set herself on fire. She then put on a bathrobe and walked 2 blocks to the place of employment of her husband. Death occurred 3 days afterward.

An old retired farmer given to morose introspection lived with his daughter and son-in-law. In a sudden fit of anger he took several shots at his daughter and subsequently started a gun battle with police. He then set the house on fire and was found asphyxiated by carbon monoxide in a closet with a few superficial knife slashes across the throat.

Whenever a body is found after a fire, evidence that the victim lived during the fire should be looked for. This consists of the presence of soot in trachea and bronchi and carbon monoxide in the blood. Complete saturation of the blood by carbon monoxide can be tested easily in the following manner: Take a drop of blood and dilute with tap water to a pink color. Use normal blood as a control and dilute to approximately the same color. Add a few drops of 10 per cent sodium or potassium hydroxide. Normal blood immediately turns brown whereas carboxyhemoglobin will retain the pink color for at least 30 seconds. Neither embalming nor putrefaction will change the amount of saturation of the blood by carbon monoxide.

OTHER METHODS

Other methods of suicide include jumping in front of moving vehicles or from buildings, and asphyxiation from carbon monoxide or illuminating gas. In most cases the circumstances surrounding the death will indicate whether suicide exists. Careful examina-

Fig. 6. The stab wound measures ½ inch and was produced with a pen knife. The forked lower end denotes the blunt edge of the blade. The sharp upper edge is slightly distorted by the superficial "scratch." This linear abrasion indicates the direction of the tip of the blade after withdrawal.

tion of the body establishes the pattern of injuries and serves to reconstruct the fatal happenings. Such examination by a skilled investigating physician will prove a satisfactory substitute whenever a postmortem examination by a forensic pathologist is not feasible. The findings combined with the evidence uncovered by the law enforcement agencies enable the physician in the majority of cases to conclude whether suicide existed. If there are as many indications for suicide as there are for accidental death, an open verdict should be rendered.

SUMMARY

More attention should be given to the medical investigation of suicide. In the future this form of violent death will assume added importance. Sooner or later it will become a matter of public concern.

The various instruments of suicide are discussed and the procedures for their investigation. The physician interested in forensic medicine can become adept at this type of investigation. In making his specialized knowledge and trained investigative mind available to the law enforcement agencies he performs a valuable service to the community.

SUGGESTED READING

1. Camps, F. E., and Purchase, W. B.: Practical Forensic Medicine, New York, The Macmillan Company, 1957.
2. Gonzales, T. A.; Vance, M.; Helpern, M.; and Umberger, C. J.: Legal Medicine; Pathology and Toxicology, ed. 2, New York, Appleton-Century-Crofts, Inc., 1954.

Dr. Hausman, Medical Examiner, Bexar County, San Antonio.

Jobs May Benefit Heart Patients

Suitable work may be more beneficial than rest and retirement for persons with severe heart disease, a Brooklyn physician reports in the September 13 issue of the *Journal of the American Medical Association.*

A total of 19 persons who would normally be considered to be unemployable but who were successfully working in industrial and clerical jobs were studied. The physical condition of some of them actually improved after they started working.

On the basis of his study, Dr. Alvin Slipyan suggested a possible change in the rule that persons with severe heart disease require constant rest and retirement from work.

The early twenties are the safest years for childbearing, Health Information Foundation reports. For every 10,000 live babies born to women in the 20-24 year old group today, only 3.2 maternal deaths occur.

CASE REPORTS

Eruptive Xanthomas in Diabetes Mellitus

DEWEY W. JOHNSTON, M.D.

Fort Worth, Texas

THE RECOGNITION of xanthomatosis secondary to diabetes mellitus dates back to Addison and Gull about 1850.[1] McGavack and Shephardson in 1933[2] collected 92 cases in the world literature. In 1941, it was said that 131 cases had been reported, but it was emphasized that many of these were xanthoma tuberosum or xanthoma disseminatum.[3] Of 21,000 diabetic patients of Joslin's only 14 were noted to have xanthoma.[4] Most recent reports on the subject are single case reports.[1, 3, 5, 6, 7, 8] It is surprising in light of recent knowledge in the field of lipid metabolism that eruptive xanthomas are not more commonly seen in untreated diabetes mellitus. Thannhausser has reviewed the xanthomatoses.[9] He urged the adoption of the term eruptive xanthoma to replace xanthoma diabeticorum since the pathogenesis is not specific for diabetes mellitus. The classification of the xanthomatoses in table 1 is after Thannhausser.

CASE REPORT

History.—A 12 year old girl 2 weeks previously had developed a nonpruritic rash over the arms, legs, and buttocks. The onset was sudden, and the lesions had continued to increase in size and number. Her history indicated that over the past 6 months she had lost 5 pounds despite a good appetite. Polydipsia and polyuria had been noted for 2 months. She had had no abdominal pain. There was no family history of diabetes or skin eruption.

Physical Examination.—The patient's weight was 70 pounds; blood pressure 90/60; pulse 80 and regular; temperature 98.4 F. She was underweight and appeared poorly nourished. Minimal pallor of the skin was present, but the color of the mucous membranes was normal. The fundi were normal. No adenopathy was present. No lesions of the mucous membranes were present. The heart and

lungs were normal. The liver and spleen were not palpable. There were many papular lesions of the skin, most prominent over extensor surfaces of the arms and legs and over the buttocks (fig. 1). To a lesser extent the lesions were noted over the back of the chest, around the umbilicus, and over the face. A pink halo was characteristic of the larger lesions. Neurological examination was normal.

Laboratory.—The hematocrit was 43 per cent. The serum was lipemic. The white blood count was 8,100 per cubic millimeter. The differential was 68 per cent segmented cells, 5 per cent bands, 22 per cent lymphocytes, 3 per cent monocytes, and 2 per cent eosinophils. Urinalysis revealed acetone and diacetic acid. The blood chemical studies are recorded in table 2, along with their follow-up reports.

Course.—The patient was given 1,800 calorie diet with normal fat content (180 Gm. carbohydrate, 80 Gm. fat, 80 Gm. protein). Initially, 35 units NPH insulin were required for control. After one week only 20 units were needed. At the end of 1 month the dose had to be reduced to 15 units. Acetone had disappeared from the urine when checked again 5 days after admission. The essential features of her course are summarized in table 2. During the period accounted for in this table she gained 6 pounds, and all skin lesions had disappeared.

COMMENT

This is a typical case of eruptive xanthomatosis of diabetes mellitus, exhibiting features characteristic of most cases reported. The rash is of sudden onset and progresses very rapidly over a short period of time. Only occasionally does the rash become slightly pruritic. The distributions of the lesions over the extensor surfaces of the extremities is characteristic. Although this patient was a young girl, the occurrence has been reported to be much more common in males than females.[3] The disappearance of the lesions following insulin therapy is ordinarily predictable and occurs over a period of 4 to 6 weeks. The mildness of the diabetes as judged by the amount of insulin required is of particular interest. This has been a feature noted too in most of the previous reports.

Dr. Dewey W. Johnston, an internist, presented this paper for the Texas Diabetes Association in Houston on April 20, 1958.

A case of eruptive xanthoma in a 12 year old diabetic girl is reported. The physiology and derangements involved in such disorders are reviewed. Special attention is given to lipid metabolism.

It is striking to see the marked degree of lipemia exist without correlation to either blood sugar or the degree of ketosis. It was necessary to reduce this girl's insulin dosage from the initial 35 units of NPH to 15 units because of the development of hypoglycemia and apparent increased sensitivity to insulin as the lipid disorder resolved. Thannhausser has emphasized the fact that insulin alone is sufficient for the correction of the hyperlipemia when it is secondary to diabetes. Dietary fat restriction is not required, as this case aptly demonstrated. To emphasize this fact, the patient gained 6 pounds

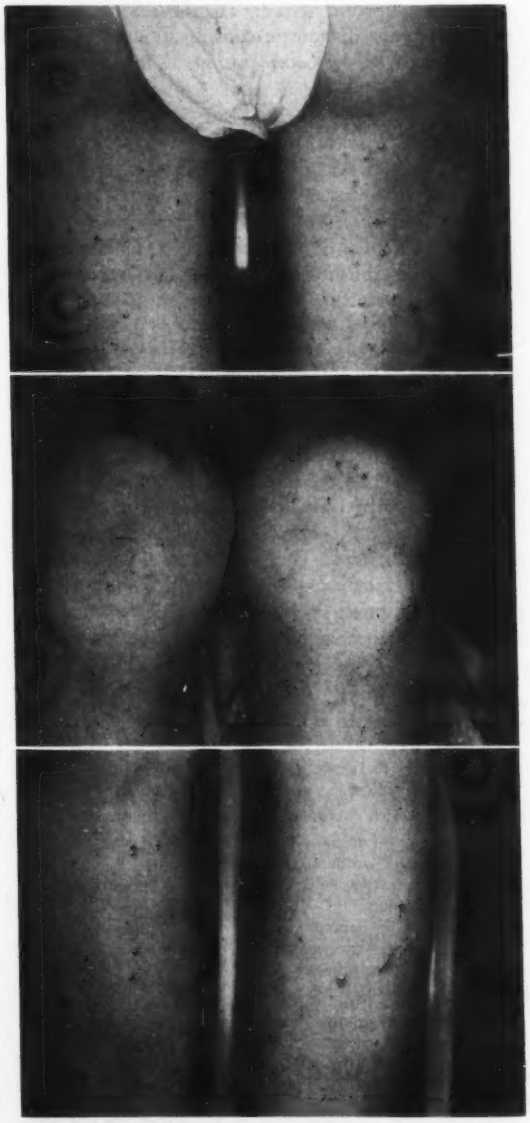


Fig. 1. Papular lesions of the skin of the buttocks, legs, and arms in a case of eruptive xanthoma.

during the period of observation, and at the same time cholesterol and fatty acids returned to normal. All cases of eruptive xanthomatosis in diabetes, secondary to diabetes mellitus, have in common hyperlipemia with increase in cholesterol and fatty acids. Most exhibit a mild ketosis. Lipemia retinalis was not observed in this case. It is said that before lipemia retinalis occurs the total lipid level exceeds 3,500 mg. per 100 cc.[1]

Differential diagnosis usually includes xanthoma tuberosum and xanthoma disseminatum, neither of which has lipemic serum. Thannhausser has aptly reviewed other diagnostic considerations. His classification aids in the consideration of the differential diagnoses.[9]

PATHOLOGICAL PHYSIOLOGY

The clinical correlation of the increased incidence of atherosclerotic disease in diabetes mellitus has long been established. Root noted an incidence of myocardial infarction of 23 per cent compared to 6 per cent in a group of persons with diabetes versus controls between 40 and 60 years of age.[10] That lipid metabolism is directly related to the development of atherosclerosis is a fact now well established. The question of so much debate has been related to the mechanisms by which such relationship may be produced or exists. Critical work on the aspects of lipid metabolism in diabetes mellitus is of recent origin. Knowledge at present is far from complete. The major developments deserve summary here, however, since there is no more dramatic disruption of lipid metabolism than occurs in eruptive xanthomatosis in the diabetic. Knowledge of the metabolic factors involved in this clinical state would shed important information on lipid metabolism in general.

TABLE 1.—*Classification of Xanthomatoses.*

Hypercholesteremic.
1. Essential xanthomatosis.
2. Secondary to liver disease.
3. Hypothyroidism.

Hyperlipemia with Secondary Eruptive Xanthoma.
1. Idiopathic—familial (associated with hepatosplenomegaly and occasionaly glycosuria).
2. Symptomatic.
   a. Diabetes.
   b. Chronic pancreatitis.
   c. Glycogen storage disease (von Gierke).
   d. Lipoid nephrosis.

Normocholesteremic.
1. Eosinophilic granula—Schuller-Christian syndrome.
2. Essential xanthomatosis of normocholesteremic type.
3. Xanthoma cells in inflammatory granulomas and true tumors.

Modified from Thannhausser, S. J.: Lipidoses; Diseases of Cellular Lipid Metabolism, Oxford Medicine, vol. 4, p. 214 (3), Oxford, Oxford University Press, 1949.

The participation of insulin in metabolism is at multiple sites. The basic mechanism by which its various functions are accomplished has not been fully explained.[10, 11, 12] Insulin is directly concerned with metabolic functions listed in table 3. Chernick and Chaikoff[12] and Stadie[11] have shown that two separate, distinct, and independent blocks exist in liver slices of the diabetic animal. First, there is a block in the early stage of glucose metabolism. Second, despite adequate acetyl coenzyme A and hydrogen for reduction, fatty acids cannot be synthesized. That different tissues do not share in the same mechanism of insulin action is noted in table 4. Adipose tissue is an active metabolic tissue with functions as pertains to insulin, very much the same as the liver. The case presented here is a striking clinical example of the effect of diabetes on lipid metabolism. Herein, we are concerned chiefly with interrelationships existing between fatty acids, cholesterol, fat transport, and glucose metabolism.

The basic mechanisms from which the various metabolic derangements of the diabetic person occur are not fully explained. It is evident, however, that acetyl coenzyme A assumes a major role. It is here that the interrelationship of fat, carbohydrate, and protein becomes apparent. In diabetes mellitus there is an increased oxidation of fatty acids. The end product of beta oxidation of fatty acids is acetyl coenzyme A. Impaired glucose metabolism and glycolysis results in a deficient supply of energy rich phosphate bonds to drive the Krebs cycle. The result of a lack of oxaloacetate to combine with acetyl coenzyme A results in the accumulation of acetyl coenzyme A. This excess of acetyl coenzyme A is further aggravated by impaired synthesis of fatty acid. As alluded to in the previous paragraph, this is a specific block in fatty acid synthesis which is corrected solely by insulin.[11, 12] Stadie has inferred that the site of the block is between acetyl coenzyme A and butyryl coenzyme A. The pathway then followed by the accumulated acetyl coenzyme A is one of condensation to acetoacetyl coenzyme A. By the action of hepatic deacylase acetoacetic acid is formed. This is a reaction which is essentially limited to the liver. This accounts for the rise in ketone bodies.

The excess of acetyl coenzyme A not only results in ketosis but also probably accelerates the pathway of cholesterol synthesis. Cholesterol is synthesized directly from "active acetate." The condensation of acetyl coenzyme A and a decarboxylation results in a 5 carbon fragment—dimethylacrylate. Six of these units condense through various steps to form squalene. This cyclizes to form cholesterol, which once synthesized has only one mode of exit—excretion by way of the bile ducts. There is no evidence that

TABLE 2.—*Course of a Case of Eruptive Xanthoma in a 12 Year Old Diabetic Patient.*

	Fasting Blood Sugar (mg./100 cc.)	Carbon Dioxide Combining Power (vol. %)	Cholesterol (mg./100 cc.)	Fatty Acids (mg./100 cc.)	Lipemia	Xanthomas
June 19	266	41	562		+	
June 21				2,130	+	No new lesions detectible
June 26					Not present for first time	
June 28			388			Early resolution
Aug. 1	105		168	172		Complete clearing

Diet—1,800 calories: 180 Gm. carbohydrate, 80 Gm. fat, 80 Gm. protein.

this excretory function is impaired in diabetes as it is in hypothyroidism. Thus again it is emphasized that endogenous synthesis takes precedence over exogenous sources in certain hypercholesterolemic states. Reduction of dietary cholesterol has no significant effect on this hypercholesterolemia, except perhaps to accentuate the pathway of synthesis.[13]

It has been mentioned that there is increased oxidation of fatty acids and impaired synthesis of long chain fatty acids; yet, in eruptive xanthomatosis tremendous elevation in serum fatty acids occurs. This increase, therefore, can result only from transport, turnover, and/or some unidentified mechanism of release from the periphery. The mechanism of this release and transport derangement is as yet unexplained. Studies of lipoproteins in diabetic acidosis and xanthomatosis have pointed out this obvious disturbance in fat transport.[15, 16] Normal transport is accomplished by progression from high to lower Sf class (from low to high density lipoprotein). Sf12-400 is elevated and the higher the Sf number the more massive the elevation. Therapy has been shown to reverse this change. This derangement in transport of fat no doubt is associated directly with the production of lipemic serum, but other unknown factors also must play a part. Relative decrease in phospholipids may be involved. A lipemia clearing factor, lipoprotein lipase, has been described. "This removes triglycerides from microscopically visible chylomicrons as well as from the more soluble lipoproteins, and the liberated fatty acids are carried by serum albumin until they gain access to intracellular oxidative systems."[16] No one has shown that this enzyme is in any way involved in the lipemia of diabetic xanthomatosis.

TABLE 3.—*Action of Insulin.*[17]

Participates indirect in—
Glucose metabolism.
Transfer of glucose across cell membrane.
Transformation of glucose to glucose-6-phosphate by hexokinase.
Formation of adenosinetriphosphate and the oxidative reactions in the Krebs cycle.
Fat metabolism.
Fatty acid synthesis—
Acetyl coenzyme A→butyryl coenzyme A (Stadie)
(Acetoacetate→acetoacetyl coenzyme A?)

TABLE 4.—*Site of Action of Insulin in Different Tissues.*

Muscle:	Cell surface only; mechanism is chiefly one of transport.
Liver:	Glucose oxidation; fatty acid synthesis.
Adipose tissue:	Same as liver.
Brain:	No demonstrable effect.

Modified from Stadie, W. C.: Newer Concepts of Action of Insulin, Am. J. Clin. Nutrition 5:393-403 (July-Aug.) 1957.

SUMMARY

A case of eruptive xanthomatosis has been reviewed. The metabolic pathways and derangements involved have been emphasized.

REFERENCES

1. Bloom, A., and Crowley, M. F.: Xanthoma Diabeticorum and Lipaemia Retinalis, Proc. Roy. Soc. Med. 49:830 (Oct.) 1956.
2. Chernick, S. S., and Chaikoff, I. L.: Two Blocks in Carbohydrate Utilization in Liver of Diabetic Rat, J. Biol. Chem. 188:389-396 (Jan.) 1951.
3. Combes, F. C., and Behrman, H. T.: Xanthoma Eruptivum (Xanthoma Diabeticorum), Arch. Dermat. & Syph. 43:927-942 (June) 1941.
4. Engel, F. L.: Influence of Endocrine Glands on Fatty Acid and Ketone Body Metabolism, Am. J. Clin. Nutrition. 5:417-430 (July-Aug.) 1957.
5. Grollman, A.: Diabetes Mellitus—Physiologic Considerations, Am. Pract. & Digest Treat. 7:557-559 (April) 1956.
6. Gumpel, R. C., and Lipton, P.: Xanthoma Diabeticorum, A.M.A. Arch. Int. Med. 96:560-564 (Oct.) 1955.
7. Joslin, E. P., and others: Treatment of Diabetes Mellitus, ed. 8, Philadelphia, Lea & Febiger, 1947.
8. Kolb, F. O.; de Lalla, O. F.; and Gofman, J. W.: Hyperlipemias in Disorders of Carbohydrate Metabolism: Serum Lipoprotein Studies in Diabetic Acidosis with Xanthomatosis and in Glycogen Storage Disease, Metabolism 4:310-317 (July) 1955.
9. Margolin, E. G.: Xanthoma Diabeticorum, Ann. Int. Med. 39:629-635 (Sept.) 1953.
10. McGavack, T. H., and Shepardson, H. C.: Xanthoma Accompanied by Hypocholesterolemia, Occurring in Otherwise Normal

Individual, and in Individual with Acromegaly and Diabetes, Ann. Int. Med. 7:582-604 (Nov.) 1933.
11. Spencer, M. C.: Xanthoma Diabeticorum, A.M.A. Arch. Dermat. & Syph. 64:92-93 (July) 1951.
12. Stadie, W. C.: Newer Concepts of Action of Insulin, Am. J. Clin. Nutrition. 5:393-403 (July-Aug.) 1957.
13. Thannhausser, S. J.: Lipidoses; Diseases of Cellular Lipid Metabolism, Oxford Medicine, vol. 4, p. 214 (3), Oxford, Oxford University Press, 1949.
14. Thompson, E. I.; Stevenson, E.; and Krock, F.: Xanthoma Diabeticorum, South. M. J. 28:895-902 (Oct.) 1935.
15. Tuller, E. F., and others: Effects of Diabetic Acidosis and Coma upon Serum Lipoproteins and Cholesterol, Diabetes 3:279-286 (July-Aug.) 1954.
16. Zilversmit, D. B.: Current Concepts of Lipide Metabolism, Am. J. Med. 23:120-133 (July) 1957.

Dr. Johnston, 901 West Leuda, Fort Worth.

Allergic Reaction To Digitalis

Case Report

RAY H. SKAGGS, M.D.

Houston, Texas

TOXIC MANIFESTATIONS from overdosage of digitalis, such as nausea, vomiting, diarrhea, disturbance of vision, and changes in the electrocardiogram, are well known, but the occurrence of a true allergic reaction to digitalis is so uncommon as to be seldom considered by most physicians.[1, 4, 6] The presentation of a patient with an allergic response to digitalis will be made.

REVIEW OF LITERATURE

From the few reports in the literature patients who have had allergic manifestations to the drug have shown urticaria and erythema predominantly. Only 1 patient has been reported as having attacks of asthma as a consequence of coming in contact with the drug—a pharmacologist who had attacks of asthma while working with powdered digitalis.[5] Most of these reported cases had the occurrence of symptoms from several days to several weeks after the administration of digitalis. The more immediate reaction occurred after the purified preparations, and the more delayed reaction occurred after the whole leaf preparation.[7] Cohen and Brodsky, however, reported a reaction within 30 minutes after the ingestion of 0.5 cc. of tincture of digitalis.[2] Of those patients who were skin tested with digitalis preparations, the majority gave negative reactions although a case reported by Mosko and Taylor gave positive direct and passive transfer tests.[3] Most of the patients reported failed to show the presence of eosinophilia, which is often associated with allergic reaction.

Once the patient has responded allergically to digitalis, drugs are notably unsuccessful in the control of this allergic response. In spite of antihistamines and even steroids, patients were not prevented from having reactions; and treatment after reactions occurred did not hasten the disappearance of the reaction. The urticarial lesions invariably disappeared from 3 to 7 days after discontinuation of the drug.

CASE REPORT

The present case is one of a patient who exhibited urticarial reactions repeatedly after administration of different forms of digitalis by different routes.

R. L. B., a 47 year old housewife, was admitted to Methodist Hospital, Houston, March 5, 1957, for mitral valvotomy. She gave a history of attacks of fever, sore throat, and migratory polyarthritis at the age of 13 and again at the age of 29. At neither time was the patient advised of the presence of heart disease. In 1952 she experienced an episode of weakness, exertional dyspnea, and pedal edema which was said to be due to thyrotoxicosis and which was improved by medication. Eighteen months later a goiter was removed surgically. Following the thyroidectomy the patient was given dessicated thyroid by mouth which was later discontinued because of the appearance of attacks of substernal pain diagnosed as angina pectoris in 1954. From that time until admission to the hospital the patient experienced exertional dyspnea, orthopnea pedal edema, and hemoptysis. In spite of treatment with mercurial diuretics she experienced progressive increase in her symptoms. Four months prior to admission to the hospital she was given whole leaf digitalis for the first time. Shortly after its administration she developed urticarial lesions and had to be hospitalized for treatment. She recovered from the urticaria in 1 week and received no further digitalis until her admission to Methodist Hospital.

Dr. Ray H. Skaggs is clinical associate professor of medicine, Baylor University College of Medicine and director, Cardio-Respiratory Unit, Methodist Hospital.

Although toxic manifestations from overdosage of digitalis are well known, true allergic reactions are rare. This report of a patient with rheumatic mitral valvular disease undergoing surgery and subsequently developing urticarial lesions following the administration of digitalis appears typical of an allergic reaction. Intravenous Benadryl gave helpful relief.

Physicial examination on admission revealed a middle aged white woman who did not appear ill. The blood pressure was 130/80, and the pulse rate was 80 per minute. The eyes, ear, nose, and throat were normal. A thyroidectomy scar was present. The heart was enlarged with the left border of cardiac dullness being in the anterior axillary line. There was a sinus rhythm present with accentuation and splitting of the pulmonary second sound. There was a rumbling diastolic and a soft blowing systolic murmur heard at the apex. There was no enlargement of the liver or pedal edema.

Laboratory studies revealed a normal blood count and urinalysis. The teleoroentgenogram revealed moderate cardiac enlargement with configuration suggesting both right and left ventricular enlargement with some prominence of the undivided pulmonary artery. The electrocardiogram showed evidence of left ventricular hypertrophy.

It was the impression of the attending physician that the patient had rheumatic heart disease with mitral stenosis and insufficiency and that, although she was not an ideal candidate for mitral valvotomy, she might well be improved by it. Gitalin, 0.5 mg. orally, was given on March 8 and March 9, 1957, and by 6 p.m. March 9 the patient had broken out with intensely pruritic urticarial lesions which covered the entire body. She was given diphenhydramine hydrochloride (Benadryl) orally, and when this failed to control the urticaria, it was administered intravenously. She obtained relief from the urticaria for about 1 hour after intravenous injection, and this was repeated as often as needed to give her relief. The gitalin was discontinued after the second dose on March 9. By the following morning the urticaria was so severe it was decided to begin the patient on steroid therapy, and prednisone, 5 mg., was given by mouth every 6 hours. The patient improved slowly but continued to require intravenous diphenhydramine for relief of the urticaria. There were no specific joint symptoms, fever, or eosinophilia.

By March 13 the urticaria had disappeared, and the diphenhydramine and prednisone were discontinued. On that day she was operated on, and the mitral valve was opened by the finger fracture technique. The valve leaflets separated easily, and there was no noticeable increase in the regurgitant jet afterwards. The operative procedure was tolerated well; however, the day after surgery she developed auricular fibrillation with a ventricular rate of 140 per minute. She was given intramuscular quinidine in an unsuccessful attempt to convert the rhythm to sinus. Because of impending cardiac failure she was given intravenous acetyl digitoxin (Cedilanid), 0.8 mg., at 12 noon and again at 6 p.m. March 15. She also was given a mercurial diuretic intramuscularly on this day. The following day she was given one of the glycosides of Digitalis lanata (Digoxin) by mouth. At midnight March 16, 36 hours after the first intravenous digitalis was given, she developed generalized urticaria. At this time she was started on intramuscular injections of ACTH gel every 12 hours and intravenous injections of diphenhydramine. The rhythm converted to sinus during the day of March 16, and no further digitalis was given. By March 18 the urticaria had cleared completely and the ACTH and diphenhydramine were discontinued. The patient was maintained on oral quinidine and had no further episodes of auricular fibrillation. She had an otherwise uneventful postoperative course and was discharged from the hospital on the tenth postoperative day.

Three months after her surgery she was seen again and found to be markedly improved symptomatically. At this time skin tests were performed with various digitalis preparations including a whole leaf preparation, Digitalis lanata, Digitalis purpurea, and Digitalis folium. In addition, ouabain was tested. Scratch and intracutaneous injection of these preparations failed to elicit a local or systemic reaction.

COMMENT

This patient was found to conform with the majority of reported cases of allergy to digitalis. The onset of urticaria after receiving a purified glycoside was 36 hours in both episodes in the hospital. After the first episode there had been some speculation among the attending physicians as to the possibility of the urticaria being due to emotional tension. It was thought by some that anxiety concerning the operation and the knowledge that she was receiving digitalis might have been sufficient to produce the urticaria. However, at the time of administration of the intravenous digitalis, the patient was not aware that she was receiving the medication. The response to oral diphenhydramine was negligible even when the drug was given in doses of 100 mg. every 2 hours. By intravenous injection, however, Benadryl was notably helpful with relief of urticaria in minutes. The effectiveness of prednisone and ACTH was more difficult to estimate. There was more rapid clearing of urticaria after the use of ACTH than with prednisone, and it may well prove to be helpful in management. However, the possibility of salt and water retention in cardiac patients makes the use of these drugs limited. The lack of response to skin test doses of various forms of digitalis, absence of eosinophilia, failure of appearance of signs of serum sickness, or anaphylactoid type of reaction would seem to be the rule rather than the exception in digitalis induced allergies.

SUMMARY

A brief case history of a patient with rheumatic mitral valvular disease undergoing surgery and subsequently developing urticarial lesions following the administration of digitalis was presented.

REFERENCES

1. Alexander, H. L.: Reactions with Drug Therapy, Philadelphia, W. B. Saunders, 1955, p. 144.
2. Cohen, R. V., and Brodsky, M. L.: Allergy to Digitalis, J. Allergy 12:69-71 (Nov.) 1940.
3. Mosko, M. M., and Taylor, R. G.: Digitalis Allergy with Demonstrable Antibody, Allergy 25:477-479 (Sept.) 1954.
4. Movitt, E. R.: Digitalis and Other Cardiotonic Drugs, ed. 2, New York, Oxford University Press, 1949.
5. Urbach, E.: Klinik und Therapie der Allergischen Krankheiten, Wilhelm Maudrich, Spitalgasse, 1935.
6. Urbach, E., and Gottlieb, P. M.: Allergy, ed. 2, New York, Grune and Stratton, 1946, pp. 323, 324.
7. Wolfe, L. S., and Geiger, A. J.: Urticaria due to Drugs of Digitalis Series, New England J. Med. 248:148-149 (Jan. 22) 1953.

Dr. Skaggs, 434 Hermann Professional Bldg., Houston 25.

MEDICAL NEWS

★ Coming Meetings

Texas Medical Association, San Antonio, April 18-21, 1959 (Conference of County Medical Society Officials and Symposium on Legislation, Jan. 24, 1959). Dr. Howard O. Smith, Pres.; Mr. C. Lincoln Williston, 1801 North Lamar Blvd., Austin, Exec. Secy.

American Medical Association, Atlantic City, June 8-12, 1959. Dr. Gunnar Gundersen, La Crosse, Wis., Pres.; Dr. F. J. L. Blasingame, 535 North Dearborn, Chicago 10, Exec. Vice-Pres.

Current Meetings

JANUARY

International College of Surgeons, U. S. Chapter, Miami Beach, Jan. 4-7, 1959. Dr. Curtice Rosser, Dallas, Pres.; Dr. Karl Meyer, 1516 Lake Shore Dr., Chicago, Secy.

Texas Radiological Society, Dallas, Jan. 30-31, 1959. Dr. R. F. Wertz, Amarillo, Pres.; Dr. J. E. Miller, 6407 Forest Lane, Dallas 30, Secy.

Texas Society of Pathologists, Houston, January 25, 1959. Dr. John H. Childers, Galveston, Pres.; Dr. Marvin H. Grossman, Box 57, Dallas, Secy.

Texas Urological Society, San Antonio, Jan. 24-25, 1959. Dr. Charles Hooks, Galveston, Pres.; Dr. Charles Hulse, 405 Medical Professional Building, San Antonio, Secy.

Twelfth District Society, Marlin, Jan. 13, 1959. Dr. W. A. Chernosky, Temple, Pres.; Dr. Bernard Roser, Corsicana, Secy.

International Medical Assembly of Southwest Texas, San Antonio, Jan. 26-28, 1959. Dr. Lawrence B. Reppert, 817 South Texas Bldg., San Antonio, Secy; S. E. Cockrell, 202 W. French Place, San Antonio, Exec. Secy.

North Texas-Southern Oklahoma Fall Clinical Conference, January, 1959. Dr. Frank J. Lee, 1300 8th, Wichita Falls, Chm.

FEBRUARY

American Academy of Allergy, Chicago, Feb. 9-11, 1959. Dr. Max Samter, Oak Park, Ill., Pres.; Dr. Bram Rose, Royal Victoria Hospital, Montreal, Canada, Secy.

American College of Radiology, Chicago, Feb. 6-7, 1959. Dr. Vincent W. Archer, Charlottesville, Va., Pres.; Mr. W. C. Stronach, 20 N. Wacker Dr., Chicago 6, Executive Director.

South Central Association of Blood Banks, Austin, February, 1959. Dr. Louis Manhoff, Jr., San Antonio, Pres.; L. Ruth Guy, Ph.D., Room 1101, Stoneleigh Hotel, Dallas, Secy.

Texas Association of Obstetricians and Gynecologists, Fort Worth, Feb. 14, 1959. Dr. Jesson L. Stowe, El Paso, Pres.; Dr. Oran V. Prejean, 1317 N. Washington St., Dallas, Secy.

Texas Proctologic Society, New Orleans, February 28, 1959. Dr. C. P. Hardwicke, Austin, Pres.; Dr. H. Gray Carter, 915 St. Joseph St., Dallas, Secy.

Texas Public Health Association, San Antonio, Feb. 22-25, 1959. Dr. D. R. Reilly, San Angelo, Pres.; Mr. Joseph N. Murphy, Jr., Box 4012, Austin 51, Executive Secy.

First District Society, Fort Stockton, February, 1959. Dr. H. D. Garrett, El Paso, Pres.; Dr. E. S. Crossett, 1501 Arizona St., El Paso, Secy.

National and Regional

American Academy of Dermatology and Syphilology. Dr. Everett R. Seale, Houston, Pres.; Dr. R. R. Kierland, Mayo Clinic, Rochester, Minn., Secy.

American Academy of General Practice, San Francisco, April 6-9, 1959. Dr. Holland T. Jackson, Fort Worth, Pres.; Mr. Mac F. Cahal, Volker Blvd. at Brookside, Kansas City 12, Executive Secy.

American Academy of Ophthalmology and Otolaryngology. Dr. LeRoy A. Schall, Boston, Pres.; Dr. W. L. Benedict, 15 Second St. S.W., Rochester, Minn., Secy.

American Academy of Pediatrics, Chicago, Oct. 20-23, 1959. Dr. Stewart H. Clifford, Brookline, Mass., Pres.; Dr. E. H. Christopherson, 1801 Hinman Ave., Evanston, Ill., Secy.

American Association for Maternal and Infant Health, 1960. Mr. Howard I. Wells, Jr., 116 S. Michigan Ave., Chicago 3, Executive Secy.

American Association for Thoracic Surgery, Los Angeles, April 21-23, 1959. Dr. Michael E. DeBakey, Houston, Pres.; Dr. Hiram T. Langston, 7730 Corondelet Ave., St. Louis 5, Secy.

American Association of Genito-Urinary Surgeons, Absecon, N. J., April 15-17, 1959. Dr. John A. Taylor, New York, Pres.; Dr. W. J. Engel, 2020 E. 93rd St., Cleveland 6, Secy.

American Association of Obstetricians and Gynecologists. Dr. William F. Mengert, Chicago, Pres.; Dr. E. Stewart Taylor, University of Colorado School of Medicine, 4200 E. 9th, Denver, Secy.

American Cancer Society. Dr. L. T. Coggeshall, Chicago, Pres.; M. R. Runyon, 521 W. 57th, New York, Executive Vice-Pres.

American College of Allergists, San Francisco, March 15-20, 1959. Dr. Merle W. Moore, Portland, Ore., Pres.; Dr. M. Coleman Harris, 450 Sutter St., San Francisco, Secy.

American College of Chest Physicians, Atlantic City, June 3-7, 1959. Dr. Donald R. McKay, Buffalo, Pres.; Mr. Murray Kornfeld, 112 E. Chestnut, Chicago 11, Executive Secy.

American College of Gastroenterology. Dr. C. Wilmer Wirts, Philadelphia, Pres.; Mr. Daniel Weiss, 33 West 60th, New York 23, Executive Director.

American College of Obstetricians and Gynecologists, Atlantic City, April 5-9, 1959. Dr. R. Glen Craig, San Francisco, Pres.; Dr. John C. Ullery, 15 S. Clark St., Chicago 3, Secy.

American College of Physicians, Chicago, April 20-24, 1959. Dr. Dwight L. Wilbur, San Francisco, Pres.; Mr. E. R. Loveland, 4200 Pine, Philadelphia 4, Secy.

American College of Surgeons. Dr. William L. Estes, Bethlehem, Pa., Pres.; Dr. Michael L. Mason, 40 E. Erie, Chicago 11, Secy.

American Congress of Physical Medicine and Rehabilitation, Minneapolis, Aug. 30-Sept. 4, 1959. Dr. Donald L. Rose, Kansas City, Kan., Pres.; Frances Baker, One Tilton, San Mateo, Calif., Secy.

American Dermatological Association, Atlantic City, June 1-4, 1959. Dr. J. Lamar Callaway, Durham, N. C., Pres.; Dr. Wiley M. Sams, 25 Southeast 2nd Ave., Miami, Secy.

American Gastroenterological Association, Atlantic City, June 5-6, 1959. Dr. C. J. Barborka, Chicago, Pres.; Dr. F. J. Ingelfinger, 65 E. Newton, Boston 18, Secy.

American Gynecological Society, Hot Springs, Va., May 25-27, 1959. Dr. Lewis C. Scheffey, Philadelphia, Pres.; Dr. A. A. Marchetti, 3800 Reservoir Rd. N.W., Washington 7, D. C., Secy.

American Heart Association. Dr. Robert W. Wilkins, New York, Pres.; Mr. John D. Brundage, 44 E. 23rd, New York 10, Secy.

American Hospital Association, New York, Aug. 24-27, 1959. Mr. Tol Terrell, San Angelo, Pres.; Dr. Edwin L. Crosby, 18 E. Division, Chicago 10, Executive Director.

American Laryngological, Rhinological, and Otological Society, Hot Springs, Va., March 10-12, 1959. Dr. G. D. Hoople, Syracuse, N. Y., Pres.; Dr. C. S. Nash, 708 Medical Arts Bldg., Rochester, N. Y., Secy.

American Neurological Association, Atlantic City, June 15-17, 1959. Dr. Bernard J. Alpers, Philadelphia, Pres.; Dr. Charles Rupp, 133 S. 36th, Philadelphia 4, Secy.

American Ophthalmological Society, Hot Springs, Va., May 28-30, 1959. Dr. Derrick Vail, Chicago, Pres.; Dr. M. C. Wheeler, 30 W. 59th, New York 19, Secy.

American Orthopaedic Association, Lake Placid, N. Y., June 15-18, 1959. Dr. C. Leslie Mitchell, Detroit, Pres.; Dr. Lee Ramsay Straub, 535 East 70th St., New York 21, Secy.

American Pediatric Society, Buck Hill Falls, Pa., May 6-8, 1959. Dr. Joseph Stokes, Jr., Philadelphia, Pres.; Dr. A. C. McGuinness, Room 1036, 2800 Quebec St., N.W., Washington 8, D. C., Secy.

American Proctologic Society, Atlantic City, June 15-18, 1959. Dr. Karl Zimmerman, Pittsburgh, Pres.; Dr. Norman D. Nigro, 10 Peterboro, Detroit 1, Secy.

American Psychiatric Association, Philadelphia, April 26-May 1, 1959. Dr. Francis J. Gerty, Chicago, Pres.; Dr. C. H. Hardin Branch, 156 Westminister Ave., Salt Lake City, Secy.

American Public Health Association. Roy J. Morton, Oak Ridge, Tenn., Pres.; Dr. Berwyn F. Mattison, 1790 Broadway, New York 19, Executive Secy.

American Society of Anesthesiologists. Dr. Ralph S. Sappenfield, Miami 37, Pres.; Dr. J. E. Remlinger, Jr., 188 W. Randolph, Chicago 1, Secy.

American Society of Clinical Pathologists. Dr. Harry P. Smith, New York, Pres.; Dr. Clyde G. Culbertson, 1040 W. Michigan, Indianapolis 6, Secy.

American Surgical Association, San Francisco, April 15-17, 1959. Dr. I. S. Ravdin, Philadelphia, Pres.; Dr. William Altemeier, Cincinnati General Hospital, Cincinnati 29, Secy.

American Urological Association, Atlantic City, April 20-23, 1959. Dr. Adolph Kutzmann, Los Angeles, Pres.; Dr. Samuel L. Raines, 188 S. Bellevue Blvd., Memphis, Tenn., Secy.

Association of American Physicians and Surgeons, Fort Worth, April 2-4, 1959. Dr. Mal Rumph, Fort Worth, Pres.; Mr. Harry E. Northam, 185 N. Wabash Ave., Chicago 1, Executive Secy.

National Tuberculosis Association, Chicago, May 24-29, 1959. Dr. Mario M. Fischer, New York, Pres.; Mrs. Wallace B. White, 1790 Broadway, New York 19, Secy.

Radiological Society of North America. Dr. Leo G. Rigler, Los Angeles, Pres.; Dr. Donald S. Childs, 713 E. Genesee, Syracuse 2, N Y., Secy.

Southern Medical Association, Atlanta, Ga., Nov. 16-19, 1959. Dr. Milford O. Rouse, Dallas, Pres.; Mr. V. O. Foster, 2601 Highland Avenue, Birmingham 5, Executive Secy.

Southern Psychiatric Association. Dr. Frank Luton, Nashville, Pres.; Dr. Iverson O. Brownell, Greenville, S. C., Secy.

Southern Surgical Association. Dr. James D. Rives, New Orleans, Pres.; Dr. George G. Finney, 2947 St. Paul, Baltimore 18, Secy.

Southwest Allergy Forum, Houston, April 26-28, 1959. Dr. Richard L. Etter, Houston, Pres.; Dr. Richard H. Jackson, 156 Hermann Professional Building, Houston, Secy.

Southwest Regional Cancer Conference. Dr. O. J. Wollenman, Fort Worth, Chm.; Mrs. Ira Frances Ball, 264 W. 11th, Fort Worth, Secy.

Southwestern Medical Association, Roswell, N. Mex., Oct.-Nov., 1959. Dr. A. R. Clausen, Albuquerque, Pres.; Dr. M. D. Thomas, 1501 Arizona St., 12-D, El Paso, Secy.

Southwestern Society of Nuclear Medicine, New Orleans, March 14-15, 1959. Dr. Herbert C. Allen, Jr., Houston, Pres.; Dr. J. R. Maxfield, Jr., 2711 Oak Lawn Avenue, Dallas, Secy.

Southwestern Surgical Congress, Denver, March 30-April 2, 1959. Dr. Louis M. Overton, Albuquerque, Pres.; Mary O'Leary, 813 Medical Arts Bldg., Oklahoma City, Exec. Secy.

Tri-State Medical Assembly. Dr. Jack Guthrie, Camden, Ark., Pres.; Dr. Jason Sanders, Sanders Clinic, Kings Highway, Shreveport, La., Secy.

United States-Mexico Border Public Health Association, Brownsville and Matamoros, Tamaulipas, Mexico, March 30-April 3, 1959. Albert O. Irigoyen, Mexico, D.F., Pres.; Dr. Jorge Román, 243 United States Court House, El Paso, Secy.

State

Private Clinics and Hospitals Association of Texas. Dr. Joe Shepperd, Burnet, Pres.; Mr. Henry E. Taylor, Medical Arts Building, Dallas, Executive Secy.

Texas Academy of General Practice, Galveston, Oct. 4-7, 1959. Dr. Charles E. Oswalt, Jr., Fort Stockton, Pres.; Mr. Donald C. Jackson, 1905 N. Lamar, Austin, Executive Secy.

Texas Academy of Internal Medicine, San Antonio, Dec. 4-5, 1959. Dr. Merton M. Minter, San Antonio, Pres.; Dr. Hugo T. Engelhardt, 1216 Main, Houston, Secy. Meetings restricted to members.

Texas Air-Medics Association, San Antonio, April, 1959. Dr. R. Henry Harrison, Bryan, Pres.; Dr. C. F. Miller, P. O. Box 1338, Waco, Secy.

Texas Association for Mental Health, Fort Worth, March 12-14, 1959. Dr. Frank Schooner, Fort Worth, Pres.; Mr. John Lane, 2410 San Antonio, Austin, Executive Director.

Texas Chapter, American Association of Public Health Physicians, San Antonio, April 19, 1959. Dr. David M. Cowgill, San Benito, Pres.; Dr. B. M. Primer, 2709 Rio Grande, Austin.

Texas Chapter, American College of Chest Physicians, San Antonio, April 19, 1959 Dr. J. O. Armstrong, Dallas, Pres.; Dr. Carlos J. Quintanilla,, Box 592, Harlingen, Secy.

Texas Club of Internists. Dr. D. D. Warren, Waco, Pres.; Dr. L. C. Carter, 2600 Procter, Port Arthur, Secy.

Texas Dermatological Society, San Antonio, April 20, 1959. Dr. Earl L. Loftis, Dallas, Pres.; Dr. E. N. Walsh, 1410 Pruitt St., Fort Worth 4, Secy.

Texas Diabetes Association, San Antonio, April 19, 1959. Dr. Merton Minter, San Antonio, Pres.; Dr. Warren W. Moorman, 901 W. Leuda, Fort Worth, Secy.

Texas Division, American Cancer Society, Austin, Dec., 1959. Dr. John A. Wall, Houston, Pres.; Mr. Curt W. Reimann, 5014 Bull Creek Rd., Austin 3, Executive Director.

Texas Heart Association, San Antonio, April 19, 1959. Dr. William B. Adamson, Abilene, Pres.; Ernest T. Guy, 404 Jesse H. Jones Library Bldg., Texas Medical Center, Houston 25, Executive Director.

Texas Hospital Association, Houston, May 11-14, 1959. Mr. W. P. Earngey, Jr., Fort Worth, Pres.; Mr. O. Ray Hurst, 2208 Main, Dallas, Executive Director.

Texas Industrial Medical Association, San Antonio, April 19, 1959. Dr. Wendell H. Hamrick, Houston, Pres.; Dr. Robert A. Wise, Box 2180, Houston, Secy.

Texas Neurophychiatric Association, San Antonio, April 19, 1959. Dr. Samuel R. Snodgrass, Galveston, Pres.; Dr. Clarence S. Hoekstra, 8215 Westchester Drive, Dallas, Secy.

Texas Ophthalmological Association, San Antonio, April 19, 1959. Dr. Harold Beasley, Fort Worth, Pres.; Dr. James Scruggs, 2223 Austin, Waco, Secy.

Texas Orthopedic Association, San Antonio, April 20, 1959. Dr. Louis J. Levy, Fort Worth, Pres.; Dr. Margaret Watkins, 3503 Fairmount, Dallas, Secy.

Texas Pediatric Society, Fort Worth, Houston, 1959. Dr. Bruce A. Knickerbocker, Dallas, Pres.; Dr. James N. Walker, 5216 W. Freeway, Fort Worth, Secy.

Texas Physical Medicine and Rehabilitation Society, San Antonio, April 19, 1959. Dr. Vann S. Taylor, Dallas, Pres.; Dr. Lewis A. Leavitt, Veterans Administration Hospital, Houston, Secy.

Texas Rheumatism Association, San Antonio, Dec. 4, 1959. Dr. Warren W. Moorman, Fort Worth, Pres.; Dr. J. Morris Horn, 3707 Gaston, Dallas, Secy.

Texas Society of Aging. Mr. Herbert Shore, Dallas, Pres.; Mrs. William B. Ruggles, 3701 Stratford, Dallas, Secy.-Treas.

Texas Society of Anesthesiologists, San Antonio, April 19, 1959. Dr. M. M. Rosenzweig, San Antonio, Pres.; Dr. M. T. Jenkins, Parkland Hospital, Dallas, Secy.

Texas Society of Athletic Team Physicians, San Antonio, April 18. 1959. Dr. Edward T. Smith, Houston, Pres.; Dr. Jack Brannon, 2715 Fannin, Houston, Secy.

Texas Society of Gastroenterologists and Proctologists, San Antonio, April 19, 1959. Dr. O. P. Griffin, 800 5th Avenue, Fort Worth, Pres.; Dr. A. C. Broders, Jr., Scott and White Clinic Hospital, Temple, Secy.

Texas Society of Ophthalmology and Otolaryngology, Fort Worth, Dec. 4-5, 1959. Dr. James T. Robison, Austin, Pres.; Dr. Edwin G. Grafton, 4319 Oak Lawn, Dallas, Secy.

Texas Society of Plastic Surgeons, San Antonio, April 18, 1959. Dr. Baron Hardy, Houston, Pres.; Dr. Raymond Brauer, 6615 Travis, Houston, Secy.

Texas Surgical Society, Austin, April 5-7, 1959. Dr. Albert Hartman, San Antonio, Pres.; Dr. G. V. Brindley, Jr., Scott and White Clinic, Temple, Secy.

Texas Traumatic Surgical Society, San Antonio, April 19, 1959. Dr. G. V. Brindley, Temple, Pres.; Dr. W. E. Crump, 1300 Eighth, Wichita Falls, Secy.

Texas Tuberculosis Association, San Antonio, March 19-21, 1959. Dr. John W. Middleton, Galveston, Pres.; Miss Pansy Nichols, P. O. Box 6158, Austin 21, Executive Director.

District

Second District Society, Lamesa. Dr. J. Vernon McKay, Lamesa, Pres.; Dr. Noble L. Rumbo, Box D, O'Donnell, Secy.

Third District Society, Plainview, April 4, 1959. Dr. Robert H. Mitchell, Plainview, Pres.; Dr. H. Fred Johnson, 2308 W. Eighth, Amarillo, Secy.

Fourth District Society. Dr. W. L. Smith, San Angelo, Pres.; Dr. S. Braswell Locker, 1501 11th St., Brownwood, Secy.

Fifth and Sixth Districts Society, Corpus Christi, July 10-11, 1959. Dr. O. L. Riley, Corpus Christi, Pres.; Dr. Thelma Frank, 1314 16th St., Corpus Christi, Secy.

Seventh District Society. Dr. Robert N. Snider, Austin, Pres.; Dr. Richard Lucas, 502 W. 13, Austin, Secy.

Eighth District Society. Dr. John H. Childers, Galveston, Pres.; Dr. M. Warren Hardwick, 829 E. Mulberry, Angleton, Secy.

Ninth District Society, Huntsville, March 19, 1959. Dr. Lyman C. Blair, Houston, Pres.; Dr. James H. Sammons, Highlands, Secy.

Tenth District Society. Dr. B. F. Pace, Beaumont, Pres.; Dr. W. J. Poshataske, Silsbee, Secy.

Eleventh District Society, May, 1959. Dr. Ben Wilson, Tyler, Pres.; Dr. Phillip W. Taylor, 833 S. Beckham, Tyler, Secy.

Thirteenth District Society, Wichita Falls, 1959. Dr. W. R. Sibley, Abilene, Pres.; Dr. R. D. Moreton, 1217 W. Cannon, Fort Worth, Secy.

Fifteenth District Society. Dr. Charles Wise, Naples, Pres.; Dr. George Bennett, 402 S. Bolivar, Marshall, Secy.

Clinics

Blackford Memorial Cancer Lectures. Dr. R. G. Gerard, 509 S. Mirick, Denison, Chm.

Dallas Southern Clinical Society, Dallas, March 23-25, 1959. Dr. C. D. Bussey, Dallas, Pres.; Millard J. Heath, 433 Medical Arts Bldg., Dallas 1, Executive Officer.

New Orleans Graduate Medical Assembly, New Orleans, March 2-5, 1959. Dr. Eugene H. Countiss, New Orleans, Pres.; Dr. Maurice E. St. Martin, 1430 Tulane Ave., New Orleans 12, Secy.

Oklahoma City Clinical Society Conference. Dr. Herman Fagin, Oklahoma City, Pres.; Miss Alma F. O'Donnell, 503 Medical Arts Bldg., Oklahoma City 2, Executive Secy.

Postgraduate Medical Assembly of South Texas, Houston, July 20-22, 1959. Dr. Herbert H. Harris, Houston, Pres.; Dr. C. Forrest Jorns, Secy., Exec. Office, 412 Jesse Jones Library Bldg., Houston 25.

Board Examinations

Texas State Board of Examiners in Basic Sciences, April, 1959. Henry B. Hardt, Ph.D., Fort Worth, Pres.; Mrs. Betty J. Anderson, Chief Clerk, 303 East Seventh, Austin.

Texas State Board of Medical Examiners, Fort Worth, June 22-24, 1959. Dr. M. H. Crabb, Fort Worth, Secy.; Mrs. Luanna Reddin, 1714 Medical Arts Bldg., Fort Worth, Assistant Secy.

MEDICOLEGAL NOTES

Statutes of Limitations Tell How Long to Keep Records

How long shall I keep medical histories, tissue reports, roentgenograms, and other patient data?

These are questions which are asked numerous times throughout the year by the physicians of Texas, and any answer will always include a reference to the "statutes of limitations."

What are "statutes of limitations" and what are the purposes and reasons for which they have been enacted? Statutes of limitations are statutes enacted by the legislature of the state involved to set forth the period of time in which an aggrieved party has to bring an action for redress; if such action is not brought within this period, thereafter it is barred. The reasoning behind such statutory enactments can be traced to the desire to discourage stale claims and to give a degree of certainty as to what acts for which a man may be held accountable.

From a physician's standpoint, a primary reason for retaining certain medical data is in the event of malpractice litigation. The statutes of limitations in Texas make no express reference to malpractice suits, but the court in Thompson v. Barnard* stated that:

> There is no special statute in Texas providing for the time in which actions for malpractice must be brought. We conclude, therefore, that the provisions of Article 5525 § 6, which declare that actions for injury done to the person of another shall be commenced and prosecuted *within two years* after the cause of action shall have accrued, and not thereafter, are applicable in this case." (Emphasis supplied.)

The decision in this case sets forth the principle that an action for malpractice must be brought within 2 years of the time that the cause of action arose. This then raises the question of just when does a cause of action for malpractice arise. Our courts on numerous occasions have held that an individual's cause of action for malpractice commences as of the date on which the alleged injury occurred. This would be true regardless of whether or not the physician continued to treat the patient beyond the date of the act of which he complains.

The next point pertains to what action on the part of the individual is necessary to constitute a commencing of an action for malpractice. It is not enough for a suit to be threatened; there must be an actual filing of the lawsuit and the issuance of summons. Once this step is taken, however, the statute of limitations no longer is applicable, and the period of time between the filing of the suit and its trial before the court has no bearing whatsoever on the question of whether or not the action has been barred.

There are several exceptions to the statutes of limitations, however, which have the effect of "tolling the statute" or retaining the status quo until the condition set forth in such exception has terminated or been removed. These exceptions are as follows: (1) minority, (2) insanity, (3) imprisonment, (4) fraudulent concealment, and (5) absence from the state of the defendant.

In the event one of these exceptions is applicable, the statutes of limitations will not bar a suit until the expiration of 2 years after the reason for such exception applying no longer exists. Of the exceptions mentioned, those pertaining to "minority" and "fraudulent concealment" are by far the most likely to be confronted, and a brief discussion of these exceptions should be beneficial.

An individual, either male or female, is considered a minor until his twenty-first birthday. As a result an action for malpractice involving a minor would not be barred by the statute of limitations until the expiration of 2 years after he has reached 21 years of age. Should the minor marry prior to his twenty-first birthday, however, this removes the disability or exception as to minority. Then suit would have to be brought within 2 years of the date of the marriage or thereafter be barred. Also, should the minor have his disabilities of minority removed by judicial process, the exception pertaining to minority would no longer apply.

The issue of fraudulent concealment most frequently arises when a malpractice suit has been brought after the expiration of the period specified in the statute of limitations. The individual bringing the suit alleges that the fraudulent concealment by the physician of certain acts or facts prevented an earlier bringing of the suit. The position taken by our courts in regard to this issue of fraudulent concealment is revealed in the following statements made by the courts in their decisions:

> In conducting a surgical operation on his patient, and in respect to any treatment he may administer, a surgeon is under the duty to exercise care. His failure to discharge this duty constitutes negligence and therefore is wrongful—but the failure does not, of itself, constitute or expose the surgeon to the imputation of fraudulent concealment. Among the essential ingredients, a fraudulent concealment in cases of this sort includes, first, *actual knowledge of the fact that a wrong has occurred,* and second, *a fixed purpose to conceal the wrong from the patient.*† (Emphasis supplied.)

> In Texas and most jurisdictions the statute runs from the time when the fraud is discovered, unless in the exercise of reasonable diligence it might have been sooner discovered.‡

> If the respective doctors knew at the time and continuously after the incision was closed that gauze sponges had been negligently permitted to remain in the patient's abdomen, and continued to treat her for fifteen days thereafter and then discharged her as sufficiently recovered from the operation to re-

**Tex. Civ. App., 1940, 142 SW 2d 231.*

†Denton v. Carrell, Tex. Civ. App., 1940, 138 SW 2d 878, Rev'd. 157 SW 2d 878.

‡McGurney v. Daugherty, Tex. Civ. App., 1929, 19 SW 2d 113.

turn to her home without disclosing such situation and without suggestion or advice as to further treatment, it would seem that such facts were pertinent in determining whether a fraudulent concealment had begun.§

Although the statute of limitations safeguards the physician to the extent that a patient must take timely steps if he wishes to seek redress for allegedly negligent acts of the physician, it likewise is seen that there are numerous exceptions to be considered. A better understanding of the basic principles of the statute of limitations and its exceptions can assist the physician greatly in determining how long certain records or medical data pertaining to his patients should be retained.

—PHILIP R. OVERTON, LL.B., Austin.

DRUG NOTES

Cyclospasmol Helpful in Treating Peripheral Vascular Disorders

CYCLOSPASMOL (Ives-Cameron) is a peripheral vasodilator useful in a wide variety of peripheral vascular disorders such as arteriosclerosis obliterans, thromboangiitis obliterans, senile obliterative arteritis, and Raynaud's disease. The generic name for cyclospasmol is cyclandelate. Chemically it is 3,5,5-trimethylcyclohexylmandelate. It is also known as spasmocyclone.

This agent is being introduced as "new" and "unique" but at the same time "has been widely prescribed in Europe since 1952."

The drug atropine is composed of a tropic acid portion along with another part called tropine. Successful synthetic derivatives have been made utilizing mandelic acid, which is very similar to the tropic acid portion. A drug similar in this respect is homatropine and its salts. Eucatropine, the mydriatic, is a drug even more closely related to Cyclospasmol.

Cyclospasmol is said to be rapidly and orally effective, the action lasting 4 to 6 hours. The effect on the peripheral blood vessel musculature is thought to be direct. The drug is said to be well tolerated and to have only minimal side effects. Cyclospasmol provides both spasmolysis and vasodilatation.

A report, accompanied by photographs, covering only 2 patients with chronic leg ulcer seems impressive enough to warrant use of the drug in this area. Furacin was applied locally.

The tablets are supplied in 100 mg. size and are usually given 1 to 2 four times a day. Slight flushing, nausea, tingling, or headache may occur with the larger doses but does not usually require stopping the treatment.

Other oral diabetic drugs are on the way. DBI may be marketed by U. S. Vitamin early in 1959; Lilly is working on Metahexamide (3-amino-4-methylbenzensulfonylcyclohexylurea). Upjohn has this same drug as Euglycin. All of these are similar and are variations of carbutamide, the drug admirably abandoned by Lilly late in clinical trial, October, 1956.

LEVANIL (Upjohn) is a mild, nonhabit forming tranquilizer of low toxicity. The adult dose is 150 to 300 mg. three or four times a day. Children are given about one-half the adult dose.

The generic name is ectylurea (2-ethyl-cis-crotonylurea). This has been on the market for some time as Nostyn by the Ames Company.

CAYTINE (Lakeside), is a new bronchodilator useful in asthma, emphysema, bronchitis, bronchiectasis, and pulmonary fibrosis. Chemically it is N-[2-(3,4-methylenedioxyphenyl)isopropyl] norepinephrine hydrochloride. It has been under clinical investigation as JB-251 since about 1954.

The drug is supplied as an inhalant and in ampules as well as in plain tablets and tablets with phenobarbital. The dosage is 1 or 2 tablets three times a day with meals and at bedtime.

Caytine fits the class of vasoconstrictors such as epenephrine, arterenol, and phenylephrine more closely than it does the ephedrine type such as Propadrine, Nethacol, or butanefrine. However, it is a new molecule, and although related, it is not very similar to any bronchodilator now being used. Its closest relative is Nylidrin Hydrochloride (Arlidin—Arlington-Funk), which has just the opposite action. Arlidin is a vasodilator; this is due to only minor differences in chemical structure.

A new tetracycline is being investigated at Lederle Laboratories; it is not available but is under clinical investigation. The compound demethylchlortetracycline is said to produce higher and better sustained levels of antibacterial activity in the serum. The new drug is said to have a half-life about 44 per cent greater than tetracycline. Serum levels in 8 patients at 48 hours were only slightly less than that of tetracycline at 24 hours. An explanation may be that the new drug may be absorbed more slowly than tetracycline. Activities were still detectable after 96 hours.

HUMATIN (Parke-Davis and Company) is an oral antibiotic still under clinical trial reported as successful against intestinal amebiasis.

DERONIL (Schering) will be available in the near future. It is a hormone corticoid based on dexamethasone (Decadron—Merck, Sharp and Dohme) and said to be more active than methylprednisolone (Meticortelone—Schering) or triamcinolone (Aristocort—Lederle, Kenacort—Squibb).

—HERBERT SCHWARTZ, M.S., Austin.

EDUCATION

Caribbean Medical Cruise Provides Postgraduate Study

The second annual Texas Medical Cruise in the Caribbean aboard the Stella Polaris for 14 days will be sponsored by the University of Texas Postgraduate School of Medicine, May 5-18.

A faculty composed of five teachers in the fields of medicine, radiology, surgery, obstetrics and gynecology, and pediatrics will provide a comprehensive, integrated program. An attractive feature of the cruise will be the inclusion of a radiologist who will present diagnostic features of the diseases under discussion, as well as safety measures with respect to the use of radiologic equipment.

In addition to regularly scheduled presentations which will comprise 25 hours, elective seminars for small groups on selected topics and visits to the medical schools in Havana and Port-au-Prince and the hospitals in Nassau and Montego Bay. Entertainment programs have been planned

§Thompson v. Barnard, 142 SW 2d 238, Aff'd. 158 SW 2d 486.

along with recreational activities such as deck sports and swimming.

Physicians taking the cruise will be registered with the University of Texas Postgraduate School of Medicine. Tuition fee is $50. For additional information, physicians may write the Postgraduate School, Texas Medical Center, Houston 25. Registration should be made prior to February 1.

Foreign Trained Physicians Pass Qualification Exam

Among the 844 foreign trained physicians taking the first worldwide American medical qualification examination held September 23 in 30 United States examination centers and 30 foreign centers, 418 passed, according to the Education Council for Foreign Medical Graduates.

These physicians are certified as possessing medical knowledge reasonably equivalent to that expected of graduates of approved American and Canadian medical schools and as having satisfactory facility in the English language. The examination results also indicate that 226 candidates came sufficiently close to passing, in spite of language difficulties, to earn temporary certificates. They are qualified to study not more than 2 years as interns or residents in United States hospitals approved for internship or residency training.

The 1959 examinations are scheduled for February 17 and September 22. To be admitted to these examinations the candidate is required to present, 3 months in advance, an application and credentials confirming that he has had 18 years or more of formal education at least 4 of which have been in a recognized school of medicine. Other sponsoring organizations of the examinations are the Association of American Medical Colleges, American Hospital Association, American Medical Association, and Federation of State Medical Boards of the United States. For further information, those interested may write the council at 1710 Orrington Avenue, Evanston, Ill.

Postgraduate Courses

Ophthalmic Pathology, San Antonio, January 24-25.—A course in ophthalmic pathology will be presented January 24-25 from 9 a.m. to 5 p.m. in the Lecture Room of the Robert B. Green Memorial Hospital in San Antonio by the University of Texas Postgraduate School of Medicine.

Pediatrics, San Antonio, January 25.—A course in pediatrics will be offered by the University of Texas Postgraduate School of Medicine January 25 from 9 a.m. until 5 p.m. at the Gunter Hotel in San Antonio.

Guest speakers will be Dr. Harold E. Harrison, Baltimore; Dr. George B. Logan, Rochester, Minn.; Dr. Theodore C. Panos, Little Rock; Dr. Mitchell E. Rubin, New York; and Dr. A. Ashley Weech, Cincinnati. The course has a 15 hour credit rating for members of the Texas Academy of General Practice; tuition fee is $15.

Radiological Physics, Houston, February 2-March 28.—The University of Texas M. D. Anderson Hospital and Tumor Institute will sponsor a practical course in radiological physics, February 2-March 28 from 8 a.m. until 12 noon, Monday through Friday in the Texas Medical Center, Houston.

Allergy, Houston, February 5-8.—The course will be sponsored by the University of Texas M. D. Anderson Hospital and Tumor Institute, February 5-8 at the Texas Medical Center in Houston.

Disease of the Chest, San Francisco, February 16-20.—The fourth annual postgraduate course on diseases of the chest will be presented by the Council on Postgraduate Medical Education of the American College of Chest Physicians at San Francisco, February 16-20.

The most recent advances in the diagnosis and treatment of heart and lung diseases, medical and surgical aspects, will be presented. Tuition will be $100, including luncheon meetings. Those desiring further information may write to the Executive Director, American College of Chest Physicians, 112 East Chestnut Street, Chicago 11.

Dermatology and Syphilology, New York, February 16-20.—A seminar in dermatology and syphilology will be given as a full time intensive course, February 16-20 at the New York University-Bellevue Medical Center Post-Graduate Medical School, New York. It will consist of illustrated lectures and demonstrations of patients and methods. Maximum class limit is 20; tuition is $20. For further information, those interested may write the Associate Dean, New York University Post-Graduate Medical School, 550 First Avenue, New York 16.

Anesthesiology, Houston, February 18-20.—The University of Texas M. D. Anderson Hospital and Tumor Institute will sponsor the fourth annual course in anesthesiology, February 18-20 from 8 a.m. until 5:15 p.m. in the Texas Medical Center, Houston. Tuition fee is $45. Twenty hours will be given those desiring credit from the American Academy of General Practice. Faculty, residents, interns, and members of the armed services will be enrolled without fee.

Guest lecturers will include Dr. John Adriani, New Orleans; Dr. Joseph F. Artusio, Jr., New York; Harold B. Crasilneck, Ph.D., Dallas; Dr. D. C. Grosskreutz, San Antonio; and Dr. M. T. Jenkins, Dallas. For additional information and application forms, those interested may write the University of Texas Postgraduate School of Medicine, Texas Medical Center, Houston 25.

University of Texas Medical Branch

Dr. George C. Kenny, professor of geology, University of California at Los Angeles, gave the Sigma Xi lectures for the University of Texas Medical Branch chapter recently in Galveston.

On November 12, a special lecture was given by Dr. T. T. Odell, Jr., of the Biology Division, Oak Ridge National Laboratory, to students and faculty of the Medical Branch.

Dr. R. M. Moore, Dr. T. G. Blocker, Jr., Dr. Stephen R. Lewis, Dr. J. M. Laughlin, and Dr. Frank Dunton, all of the Medical Branch, participated in the fourth clinical congress of the American College of Surgeons held in Chicago, October 4-9. Dr. E. B. Evans presented a paper on "Bone and Joint Changes Following Burns."

Dr. G. W. N. Eggers, Jr., was guest speaker for the Louisiana Orthopedic Association October 15-19 in New Orleans.

Dr. George R. Herrmann, Dr. E. Peter Garber, Dr. Edward Futch, and Dr. John Derrick participated in the thirty-fourth annual meeting of the American Heart Association held in San Francisco in October. Dr. James V. Warren, chairman, Department of Medicine, served as meeting chairman of the scientific sessions.

Dr. Patrick Romanell, professor of medical philosophy, participated in the University of Indiana's Conference on Mexican Culture, held in Bloomington, November 17.

Dr. Edgar A. Blair has joined the staff of the Department of Physiology at the Medical Branch as associate professor.

Baylor University College of Medicine

Dr. John F. Loutit, director, Radiobiological Research Unit, Atomic Energy Research Establishment of Harwell, England, spoke on "Lessons in Physiology from Radiation Chimaeras" at Baylor University College of Medicine in Houston recently. Dr. Michael G. P. Stoker of the Department of Pathology, Cambridge University, England, spoke before the weekly seminar of the Texas Medical Center Research Society November 5 on "Studies on Growth and Latency with Herpes Virus." Dr. William H. McMenemey of Maidavale Hospital, London, lectured to sophomore students November 10.

MEDICAL MEETINGS

New Orleans Medical Assembly Features 18 Guest Speakers

The twenty-second annual meeting of the New Orleans Graduate Medical Assembly will be held March 2-5 at the Roosevelt Hotel in New Orleans.

Guest speakers for the meeting will include Dr. Paul R. Dumke, Detroit; Dr. Otto H. Janton, Philadelphia; Dr. Carl T. Nelson, New York; Dr. Clifford J. Barborka, Chicago; Dr. Malcom E. Phelps, El Reno, Okla.; Dr. Keith P. Russell, Los Angeles; Dr. William Dameshek, Boston; Dr. Howard P. Rome, Rochester, Minn.; Dr. R. Gordon Douglas, New York; Dr. Maynard C. Wheeler, New York; Dr. Lenox D. Baker, Durham; Dr. Ben H. Senturia, St. Louis; Dr. Francis Bayless, Cleveland; Dr. Lee F. Hill, Des Moines; Dr. Roy R. Greening, Philadelphia; Dr. John M. Dorsey, Evanston, Ill.; Dr. F. Henry Ellis, Jr., Rochester, Minn.; and Dr. Fred K. Garvey, Winston-Salem, N. C.

The program will include 54 discussions on many topics of current medical interest, in addition to clinicopathologic conferences, symposiums, medical motion pictures, round-table luncheons, and technical exhibits.

Following the meeting, arrangements have been made for a clinical tour to Mexico City, Cuernavaca, Taxco, Acapulco, and San Jose Purua, leaving from New Orleans March 6 and returning March 21. Details of the meeting and clinical tour are available at the office of the Assembly, Room 103, 1430 Tulane Avenue, New Orleans 12.

Psychiatry and Neurology Institute Set for February in Arkansas

The eleventh annual Institute in Psychiatry and Neurology will be held February 26-27 at the Veterans Administration Hospital in North Little Rock, Ark.

Special conferences in clinical psychology, psychiatric social work, psychiatric nursing, and psychiatric aspects of recreation will be held. Dr. Leo H. Bartemeier, Seton Institute, Baltimore, past president of the American Psychiatric Association, will give the principal address at the evening dinner session, February 25.

Participants in the institute will include Dr. Kenneth E. Appel, Ardmore, Pa.; Dr. Dexter M. Bullard, Rockville, Md.; Dr. Francis J. Gerty, Chicago, president, American Psychiatric Association; Dr. Bernard I. Kahn, San Francisco; Dr. Edith M. Lentz, Minneapolis; Dr. G. Wilse Robinson, Kansas City; Dr. Mathew Ross, Washington, D. C.; and Dr. Stewart Wolf, Oklahoma City.

All interested professional personnel are invited to attend; registration is free.

Cancer Symposium to Be Held At M. D. Anderson Hospital

The thirteenth annual Symposium on Fundamental Cancer Research will be held February 26-28 at the University of Texas M. D. Anderson Hospital and Tumor Institute in Houston for all interested physicians.

Co-sponsors for the symposium will be the University of Texas Postgraduate School of Medicine, the American Cancer Society, Texas Division, and the Texas State Department of Health.

Among the major topics of the meeting will be fundamental aspects of genetics in carcinogenesis, gene interaction in neoplastic growth, genetic basis of cell resistance, and heredity and human cancer.

In addition to the faculty of the University of Texas M. D. Anderson Hospital and Tumor Institute, guest speakers from the United States and several foreign countries will participate. They are David M. Bonner, Ph.D., New Haven, Conn.; Alfred E. Mirsky, Ph.D., New York; Dr. R. Latarjet, Paris, France; M. Demerec, Ph.D., New York; C. D. Darlington, D.S., Oxford; Jack Schultz, Ph.D., Philadelphia; Dr. Elie Wollman and Dr. Francois Jacob, Paris, France; Walter E. Heston, Ph.D., Bethesda, Md.; Dr. George Klein, Stockholm; Theodore S. Hauschka, Ph.D., New York; James F. Crow, Ph.D., Madison, Wis.; William J. Schull, Ph.D., Ann Arbor; Dr. Newton Morton, Ph.D., Madison, Wis.; Dr. Madge Macklin, Columbus, Ohio; and Howard B. Andervont, D.S., Bethesda, Md.

A social hour and dinner will be held February 27. For further information and registration blanks, those interested may write: Symposium Chairman, University of Texas M. D. Anderson Hospital, Texas Medical Center, Houston 25.

Texas Physicians Elected To Cancer Society Positions

More than 300 delegates and members from 188 county units representing 100,000 volunteers participated in the thirteenth annual meeting of the Texas Division of the American Cancer Society, December 4, in Austin.

At the meeting, Dr. David A. Todd, San Antonio, was elected vice-president and president-elect and Dr. John A. Wall, Houston, took over the presidency. Physicians elected as directors include Dr. Porter Brown, Fort Worth; Dr. E. Jackson Giles, Corpus Christi; Dr. Stephen Lewis, Galveston; Dr. Irving M. Richman, Beaumont; Dr. Robert L. Sewell, Fort Worth; Dr. John D. Weaver, Austin; and Dr. Jarrett E. Williams, Abilene.

Elected as members of the executive committee of the Texas Division were Dr. G. V. Brindley, Sr., Temple; Dr. Wilbur Q. Budd, Amarillo; Dr. John H. Childers, Galveston; Dr. R. Lee Clark, Houston; Dr. J. Layton Cochran, San Antonio; Dr. Edward C. Hinds, Houston; Dr. May Owen, Fort Worth; Dr. Andrew B. Small, Dallas; Dr. Howard O. Smith, Marlin; Dr. Grant Taylor, Houston; and Dr. John F. Thomas, Austin.

Charles A. Pomerat, Ph.D., of the University of Texas Medical Branch in Galveston was selected to receive the 1959 national divisional award of the American Cancer Society for his outstanding contributions as a research scientist in the field of cancer control. An award also was presented to the Texas Division from the national society for its outstanding work in developing good medical relationships.

Physicians and Surgeons Group Plans Two Meetings in 1959

Delegates at the interim meeting of the Association of American Physicians and Surgeons, held in Chicago, October 10-11, adopted a resolution of opposition to the corporate practice of medicine by a medical college or hospital.

It was announced that the annual meeting of the delegates and assembly will be held in the fall of each year. In order to make the change legally and to avoid the task of amending the by-laws, it will be necessary to hold two annual meetings in 1959—one in Fort Worth, April 2-4, at the Hilton Hotel and a second in October at St. Louis, the date to be announced later. Dr. Louis S. Wegryn of Elizabeth, N. J., was nominated for the presidency to succeed Dr. Mal Rumph of Fort Worth; the election will be held in April.

At the banquet on October 10, Thurman Sensing, executive vice-president of the Southern States Industrial Council in Nashville, Tenn., gave the address. Dr. Rumph spoke briefly at both morning sessions. He pointed out the headway which the Association is making toward its objectives by way of an increasing and more active membership and through the dedicated efforts of more workers. Among the committee reports given were those by Dr. John K. Glen of Houston on public relations and Dr. E. E. Anthony, Jr., Fort Worth, on the annual meeting.

Urological Society to Meet

All physicians are invited to attend the Texas Urological Society meeting, January 24-25, at the Menger Hotel in San Antonio. Dr. Rubin Flocks of Iowa City, Iowa, will be guest speaker. A cocktail party and buffet will be held January 24. Advance registration is requested. For further details, those interested may write Dr. Charles Hulse, secretary-treasurer, 405 Medical Professional Building, San Antonio.

Harris General Practice Academy

Harris County Academy of General Practice elected the following new officers at its annual business meeting, November 10 in Houston. They are Dr. Ben Walpole, Houston, president-elect; Dr. J. Winston Morrison, Houston, vice-president; Dr. Jack D. Gerdes, Houston, secretary; Dr. Joseph T. Ainsworth, Houston, treasurer; and Dr. Homer A. Taylor, member of the board of directors. These doctors will take office on January 1, at which time Dr. William M. Sherrill, Houston, will become president.

OF GENERAL INTEREST

Rehabilitation Center's Outlook Not Yet Definable

The outlook for the Texas Rehabilitation Center at Gonzales is still not clearly definable as its determined campaign for survival neared the end of its fourth month, according to Walter H. Richter, executive director.

"We still have a tough job ahead of us even though we have had a fine response thus far from many friends who are concerned that these unique facilities continue to be available," said Mr. Richter.

The center is in the process of setting up a permanent statewide organization which the center hopes will enable it to meet continuing financial needs, while at the same time develop important liaison between the center and handicapped individuals in each community who need its service.

Texas Institutions Use March of Dimes Funds

Donations from the January March of Dimes drive are expected to strengthen reserves for the National Foundation's expanded fight against arthritis, birth defects, and poliomyelitis, foundation officials report. Two Texas institutions recently were awarded grants from these funds; Texas will also benefit from the new scholarship program which the foundation is sponsoring.

Baylor University College of Medicine at Houston was awarded two grants, one for $167,000 to be executed by Dr. Stanley W. Olson and another for $19,000 to be under the direction of Dr. Paul R. Harrington. A third grant for $234,000 was given to the Southwestern Poliomyelitis Respiratory Center at the Jefferson Davis Hospital in Houston. Executor for this grant is Dr. William A. Spencer.

In an effort to help overcome the shortages of personnel in the health field, the foundation is sponsoring a multimillion dollar scholarship program designed to assist students of medicine, nursing, physical therapy, occupational therapy, and medical social work. Its present scholarship program will be continued, but it will be modified and expanded where necessary.

A minimum of 505 health scholarships will be offered each year under the new program. They will be made available on a geographic basis with heavily populated states receiving as many as 25. Texas will receive 20 annual scholarships, 4 in each of the health professions listed.

Over the next 10 years, this scholarship program will cost at least $12,000,000, foundation officials estimate. Each scholarship awardee will receive $500 a year for 4 years. The total number of scholarships each year will cost more than $1,000,000.

The foundation's efforts in the field of birth defects are being limited to those caused by spina bifida, meningocele, and hydrocephalus. Its work with rheumatoid arthritis includes only those patients up to age 18. The foundation's responsibilities with regard to poliomyelitis continue as in the past.

Personals

Dr. Odon F. von Werssowetz, medical director of the Texas Rehabilitation Center at the Gonzales Warm Springs Foundation in Gonzales, spoke at the meeting of the Oklahoma Chapter of the American Physical Therapy Association held November 8 at the University of Oklahoma. Dr. von Werssowetz' topic was "Bracing of Upper and Lower Extremities."

Physicians elected to offices in the Southwest District Heart Association included *Dr. William J. Block,* San Antonio, president-elect; *Dr. Fred Frueholz, Jr.,* New Braunfels, vice-president; and Dr. Joe Kopecky, Sr., San Antonio, medical adviser. *Dr. Harold C. Day,* Boerne, is the association's president.

Dr. Robert A. Murray of Temple was elected president of the Texas Society for Crippled Children and Adults at

the society's November meeting in Dallas. The Texas society met in conjunction with the national convention of its parent organization, the National Society for Crippled Children and Adults. Approximately 1,500 persons attended the Dallas meeting.

Two speakers at the November meeting of the Texas Nurse Home Association held in Waco were *Dr. Howard O. Smith* of Marlin, President of the Texas Medical Association, and *Dr. Henry A. Holle,* Austin, state commissioner of health.

New vice-chairman for the Texas Commission on Alcoholism is *Dr. Walter C. Goddard* of Austin. Dr. Goddard succeeds W. J. Barnes of Houston.

Dr. Herman I. Kantor of Dallas was recently elected chief of the obstetrics and gynecology service at St. Paul's Hospital and appointed as associate clinical professor of obstetrics and gynecology at the University of Texas Southwestern Medical School. Dr. Kantor is currently president of the Dallas-Fort Worth Obstetrical and Gynecological Society.

Officers for the Houston Pediatrics Society are *Dr. Robert D. Lomas,* Houston, president, and *Dr. Juanita Hart,* Bellaire, vice-president.

A daughter was born October 7 to *Dr. and Mrs. Emmett N. Wilson, Jr.,* of Pearsall.

Amarillo Hospital District Approved in Constitution

An amendment to the Texas Constitution allowing the formation of an Amarillo hospital district was passed November 4 in the general election.

Two city and county votes are required now—one will be to accept the formation of the hospital district and the other to provide funds for the operation of district facilities. If the vote passes, all public funds now spent on hospitals and many related health facilities will be discontinued and will be concentrated in the district levy.

Eventual goal of those sponsoring the hospital district plan is a medical center which will be planned to include a new modern hospital including a psychiatric wing and an outpatient clinic, a rehabilitation center, a public health center, a medical branch of the University of Texas, a lower cost hospital devoted to convalescent care, a nursing home for the aged, a residency program for doctors and interns, a school of nursing, quarters for the Potter County Memorial Blood Center, quarters for voluntary health agencies, and another non-profit hospital financed possibly by a church group.

Contact Lens Technicians Certified

Thirteen persons have been granted certification as contact lens technicians by the Texas Ophthalmological Association's Council on Certification and Education for Ophthalmic Technicians. The association points out that this is the first time medical certification has been provided for contact lens technicians in any state so far as is known. Certificates were issued only after candidates had passed both written and practical examinations.

Application for candidates for examinations in 1959 will be accepted prior to July 1. Forms can be obtained from Dr. Richard Leigh, Medical Towers Building, Houston.

Emergency Hospitals Available To Civil Defense Directors

Out of 78 emergency hospitals allotted Texas to be stored by local civil defense officials and put to use in the event of enemy attack or widespread natural disaster, only 18 have been placed, according to Claude Yaun, Austin, operations officer of the state's Division of Defense and Disaster Relief.

Civil defense directors in each community are encouraged by the state department and the Texas Medical Association's Committee on National Emergency Medical Service to request one of these hospitals for their community. "It is important, first, because it will advance a vital phase of this state's disaster preparedness program for its people," Mr. Yaun said. "Secondly, we fear that if we are laggard or apathetic in getting the hospitals placed, we stand in danger of losing part of our allotment to areas, particularly in the Eastern States," he said.

Texas has a larger number of potential enemy bomb targets than any other state in the nation, according to Mr. Yaun. Sixteen of our cities are considered probable targets because of industrial concentration; 14 because of nearby military installations.

Each packaged hospital contains equipment for wards with 200 beds, three operating rooms, triage room, pharmacy, x-ray room, clinical laboratory, sterilizing room, and central supply room. It can be set up within a matter of hours and has been done in practice sessions in 55 minutes. There is no cost to the cities receiving the hospitals although the total cost of each hospital is $21,316.11.

The local civil defense director must request the hospital and agree to be responsible for it. This is an opportunity for a responsible citizen group, particularly the medical societies, could perform a public service, said Mr. Yaun. Local officials are far more likely to take the necessary action if they are aware of a local demand.

Eventual goal, according to Mr. Yaun, is to ring the major population centers with stored hospital units and spot them near target areas over the rest of the state. The quota is based on one hospital unit for each 70,000 people in a metropolitan target area.

At the present time hospitals have been approved for storage in the cities of Fredericksburg, Springtown, Weatherford, Kemah, Mercedes, Brownsville, West Columbia, Alpine, El Campo, Floresville, Devine, and Stephenville. In addition hospitals have been applied for by the cities of Robstown, Nacogdoches, Keene, and Longview, and Jefferson County.

Exams Set for Commission To Public Health Corps

Competitive examinations for physicians desiring appointment to the commissioned corps of the United States Public Health Service will be held throughout the nation April 21-24. Application for these examinations must be filed with the Surgeon General no later than March 6.

The examinations are customarily held at the Public Health Service installation nearest the applicant's home, school, or place of business. Time and place of the examinations will be announced to all applicants well in advance of the examination dates.

To be eligible for appointment to the regular corps of the Public Health Service, candidates must be United States citizens, graduates of approved schools, and at least 21 years of age. Application forms and further information may be obtained by writing to the Surgeon General, United States Public Health Service, Washington 25, D. C.

New Advisory Committee Endorses Regional Mental Health Centers

Members of the Medical Advisory Committee of the State of Texas Department of Health's Division of Mental Health met in Austin November 8 to endorse strongly the idea of regional mental health centers controlled by local authorities under minimum standards set by the state department.

The committee recommended that the centers be flexible enough to encompass all phases of mental health and be partially supported by local funds. Such procedure would include experimental development of at least two or three regional centers in the next 2 years and a study of ways to get community supported mental health centers located in areas of greatest need throughout the state.

Established last June by Dr. Henry A. Holle, commissioner of health, Austin, the committee met first on July 19 and voted to meet three times a year. Committee members will serve for 3 year terms. To get the 3 year rotation system into operation, however, some of the original members were appointed to serve terms of 1 and 2 years.

Members of the committee serving 3 year terms are Dr. Eugene C. McDanald, Jr., Galveston; Dr. J. E. Rorie, Texarkana; Dr. R. L. Stubblefield, Dallas; and Dr. Dorothy Wyvell, Midland. Those serving 2 years are Dr. Spencer Bayles, Houston; Dr. Melvin A. Casberg, Austin; Dr. W. R. Metzger, Corpus Christi; and Dr. Grant Taylor, Houston; and 1 year members are Dr. Abe Hauser, Houston; Dr. H. M. Little, Houston; and Dr. Andrew S. Tomb, Victoria.

Among the duties of the committee are to inform the State Department of Health of interests and concerns of physicians in community mental health; to consult with the staff on ways and means of increasing participation and recognition of physicians in community mental health activities; to advise the staff of services which the Division of Mental Health might make available to physicians; and to help guide the thinking of the state department in the development of any plans designed to increase mental health services to the people and communities of Texas.

In addition to the new advisory committee, the Division of Mental Health of the State Department of Health has initiated a quarterly *Newsletter for Texas Psychiatric Clinics*, the first issue of which was distributed in November.

Southwestern Medical Center Officially Established

The Southwestern Medical Center was officially established recently at a meeting of a council composed of representatives from the Southwestern Medical Foundation, University of Texas, Dallas County Hospital District, City of Dallas, Dallas County, St. Paul Hospital, Dallas *Morning News* and Dallas *Times Herald*.

Dr. Melvin A. Casberg of Austin was elected vice-chairman of the council. A proposed charter for the organization now is being studied by the eight member institution and will be offered for adoption at the next meeting of the council.

At its initial meeting, the council approved in principle the broad development outlined by E. A. Salmon, New York planning consultant. The plan outlined by Mr. Salmon envisions the following: continued expansion of Southwestern Medical School and its research and teaching facilities, enlargement of Parkland Memorial Hospital to an eventual capacity of 1,200 beds, building of two voluntary hospitals of 500 or 600 beds with an expansion potential of at least 100 more beds, and development of a system of internal roadways to integrate the medical center with external streets and roads.

Old Photographs Wanted

The Illinois State Medical Society would like to borrow old photographs showing physicians at the wheels of cars of 1900-1910 vintage for an exhibit centered around an Illinois Medical Society article which told of the role of physicians in the development of the automobile in the United States at the turn of the century.

The society asks that photographs be accompanied by the name of the physician pictured, his town, whether living or deceased, and the make and year of the automobile. Pictures should be sent to John A. Mirt, Illinois State Medical Society, 185 North Wabash Avenue, Chicago 1. They will be returned unharmed.

Board of Vocational Nurse Examiners

At the two recent meetings of the Board of Vocational Nurses on August 23 and October 25, 764 candidates passed the state examination and were issued licenses, reported Dr. George M. Hilliard, president of the board.

Including the approval of 17 reciprocity applications at these meetings, there have been a total of 19,649 licenses issued since the inception of the Vocational Nurse Law in September, 1951. The next state board examination is set for March 21 in Austin. Deadline for submitting applications for this examination is February 18. For further information, those interested may write to the board at 904 Lavaca Street, Austin 1.

Mental Health Directories

"Mental Health Services, A Directory for Texas," has been prepared by the Texas Association for Mental Health and the Division of Mental Health of the Texas State Department of Health and distributed free to local and state agencies, health and welfare organizations, and professional practitioners in the field. The loose leaf booklet may be obtained by interested lay people upon request from either agency.

Board of Thoracic Surgery

Texans certified by the Board of Thoracic Surgery on October 5 were Dr. James G. Gabbard, Corpus Christi; Dr. Robert C. Jackson, Harlingen; Dr. Herbert V. Swindell, Lackland Air Force Base; and Dr. Charles T. Meadows, Wharton.

Dallas Foundation Formed

The Timberlawn Foundation, headed by a group of Dallas business and professional men, recently has been formed to foster research and education in psychiatry. The foundation will further the work already carried on at Timberlawn Sanitarium, which is said to be the oldest private psychiatric hospital in the Southwest.

Physicians who are members of the board of trustees are Drs. Jack G. Kerr, Everett C. Fox, Charles L. Bloss, Howard M. Burkett, and Perry C. Talkington, all of Dallas.

Articles by Texas Physicians

The following articles have been written by Texas physicians and are available at the Memorial Library of the Texas Medical Association.

Agnew, Colvin H.: *Metastatic Malignant Melanoma of the Kidney Simulating a Primary Neoplasm,* Am. J. Roentgenol. 80:813-816 (Nov.) 1958.

Arnold, Jasper H.: *Approach to the Capsule of the Prostate by Modified Young Technique,* J. Urol. 80:151-154 (Aug.) 1958.

Beasley, Harold: *Levator Muscle Surgery,* J. Arkansas M. Soc. 55:196-202 (Oct.) 1958.

Bjerk, E. M., and Hornisher, J. J.: *Narcolepsy: A Case Report and a Rebuttal,* Electroencephalog. & Clin. Neurophysiol. 10:550-554 (Aug.) 1958.

Blocker, Truman G., Jr.: *The Care of Patients with Burns,* Nursing Outlook 6:382-383 (July) 1958.

Bonte, Frederick J., and Reynolds, Jack: *Hydrocarbon Pneumonitis,* Radiology 71:391-397 (Sept.) 1958.

Boylston, Bedford F., and Knight, Roland M.: *Short Oblique Fracture of the Tibia,* J.A.M.A. 167:1477-1482 (July) 1958.

Brennan, John J.: *Use of Sympathetic Blocks in Orthopedic Surgery,* J.A.M.A. 168:504-508 (Oct.) 1958.

Brindley, Hanes H.: *Central Dislocation Arthroplasty of the Hip,* South. M. J. 51:905-908 (July) 1958.

Browning, Carroll W., and Quinn, Lester H.: *The Use of Hypnosis in Suppression Amblyopia of Children,* Am. J. Ophth. 46:53-67 (July) 1958.

Burnside, Ronald M.: *Surgery for Senile Macular Degeneration,* Am. J. Ophth. 46:584-586 (Oct.) 1958.

Carabasi, Robert J.: *Diffuse Interstitial Pulmonary Fibrosis (Hamman-Rich Syndrome),* Am. Rev. Tuberc. 78:610-622 (Oct.) 1958.

Chapman, John S.: *Coccidioidal Infections in Man,* M. Times 86:929-936 (Aug.) 1958.

Coggleshall, Howard C.: *A Trial of the Latex Fixation Test for Rheumatoid Arthritis,* Am. J. Clin. Path. 30:28-31 (July) 1958.

Crews, E. R.: *Pilot Studies in the Treatment of Burns in Infants and Children,* Am. Surgeon 24:770-783 (Oct.) 1958.

Daniel, N. B.: *The Fundamental Question of Dermatitis at Lone Star Ordnance Plant,* Indust. Med. 27:421-422 (Aug.) 1958.

Day, P. L., and Hinchey, J. J.: *Postspinal Anesthesia Osteomyelitis of the Lumbar Spine,* Clinical Orthopaedics 11:185-193 (Spring) 1958.

DeBakey, Michael E.: *Surgical Considerations of Occlusive Disease of the Abdominal Aorta and Iliac and Femoral Arteries: Analysis of 803 Cases,* Ann. Surg. 148:306-324 (Sept.) 1958.

DeBakey, Michael E.; Cooley, Denton A.; Crawford, E. Stanley; and Morris, Geroge C., Jr.: *Aneurysms of the Thoracic Aorta,* J. Thoracic Surg. 36:393-420 (Sept.) 1958.

Dennis, Joe B.: *Bilateral Recurrent Dislocations of the Superior Triofibular Joint with Peroneal-Nerve Palsy,* J. Bone & Joint Surg. 40A:1146-1158 (Oct.) 1958.

Eade, Gilbert G.: *The Relationship Between Granulation Tissue, Bacteria, and Skin Grafts in Burned Patients,* Plast. & Reconstruct. Surg. 22:42-55 (July) 1958.

Fields, Williams S.: *Roentgenographic Diagnosis and Surgical Treatment of Basilar Artery Insufficiency,* J.A.M.A. 168:509-514 (Oct.) 1958.

Freeman, Bromley S.: *Sialography in Children,* Surg., Gynec. & Obst. 107:505-510 (Oct.) 1958.

Garner, Curtis M.: *Observations on the Fine Structure of the Carotid Body,* Anat. Rec. 130:691-709 (April) 1958.

Grollman, Arthur: *Hypotension-Inducing Drugs and Their Relation to Hypertension,* Postgrad. Med. 24:241-245 (Sept.) 1958.

Hejtmancik, Milton R.: *Paroxysmal Supraventricular Tachycardias Complicating Organic Heart Disease,* Am. Heart J. 56:671-684 (Nov.) 1958.

Holt, J. O. S., Jr.: *The Value of Clinical "Work-Up" in the Diagnosis of Chest Disease,* South. M. J. 51:1193-1196 (Sept.) 1958.

Jordon, George L.: *Caudal Pancreatojejunostomy in the Management of Chronic Relapsing Pancreatitis,* Surgery 44:303-311 (Aug.) 1958.

Karnaky, Karl John: *Candidal Vulvovaginitis Treatment with a New Non-Staining, Non-Messy Gentian Violet,* Arizona Med. 15:578-581 (Aug.) 1958.

Karnaky, Karl John: *Trichomoniasis,* South. M. J.

Kaufman, Raymond H.; Topek, Nathan H.; and Abbot, Jack P.: *Postpartum Cervical Cytology,* Obst. & Gynec. 12:189-194 (Aug.) 1958.

Klingman, Walter O.: *Treatment of Heredodegenerative Disorders,* Neurology 8:633-639 (Aug.) 1958.

Leader, Abel J.: *Chronic Vesiculoprostatitis—A Reorientation,* J.A.M.A. 168:995-999 (Oct. 25) 1958.

Lawson, John D.: *The Free Achilles Reflex in Hypothyroidism and Hyperthyroidism,* New England J. Med. 259:761-764 (Oct. 16) 1958.

Leonard, Morton H.: *Trochanteric Syndrome,* J.A.M.A. 168:175-177 (Sept. 13) 1958.

Lyles, Thomas W.: *Atypical Features in Familial Benign Chronic Pemphigus,* Arch. Dermat. & Syph. 78:446-453 (Oct.) 1958.

Martin, Charles L., and Martin, James A.: *Treatment of Cancer of the Floor of the Mouth and Its Cervical Metastases by Irradiation,* South. M. J. 51:1017-1025 (Aug.) 1958.

Maxfield, J. R., Jr.: *Atomic Medicine—Use of Radioactive Isotopes in Medicine and in Surgery,* J.M.A. Georgia 44:447-453 (Sept.) 1958.

Miller, David V., and Ford, Ralph V.: *Observations on Amonozine (W-1191-2), A Triazine Diuretic Compound,* Am. J. M. Sc. 236:32-40 (July) 1958.

Moncrief, John A.: *Third Degree Burns of the Dorsum of the Hand,* Am. J. Surg. 96:535-544 (Oct.) 1958.

McGovern, John P., and Daeschner, C. W., Jr.: *The Role of Fluid and Electrolytes in the Management of Severe Asthma,* South. M. J. 51:1197-1202 (Sept.) 1958.

McKeever, Duncan C.: *Thawing the Frozen Shoulder,* Clinical Orthopaedics 11:168-176 (Spring) 1958.

McMillan, Charles D.: *Differential Diagnosis of Hirsutism,* South. M. J. 51:820-824 (July) 1958.

Nelson, Robert S.: *Gastroscopic Photography,* Gastroenterology 35:74-77 (July) 1958.

Nelson, Robert S., and Salvador, Dionisio S. J.: *Pseudotumors of Gastric Antrum in Pernicious Anemia,* J.A.M.A. 167:1487-1789 (July 19) 1958.

Patterson, John B.: *Congenital Orbital Deformity,* Plast. & Reconstruct. Surg. 22:271-274 (Sept.) 1958.

Paulson, Donald L.: *The Early Detection and Treatment of Bronchogenic Carcinoma,* J. Louisiana M. Soc. 110:236-243 (July) 1958.

Gilbert, Enid F., and Rainey, John R., Jr.: *Meconium Peritonitis Caused by a Rupture of a Meckel's Diverticulum in a Newborn Infant,* J. Pediat. 53:597-601 (Nov.) 1958.

Rowe, Caroline W.: *Increasing Scope of Bronchography with Dionosil,* Radiology 71:383-390 (Sept.) 1958.

Samuels, Melvin L.: *Nedele Biopsy of Pleura,* Cancer 11:980-983 (Sept.-Oct.) 1958.

Selman, Joseph: *Ureterocele: Roentgenologic Diagnosis with Report of an Unusual Case,* Am. J. Roentgenol. 80:620-626 (Oct.) 1958.

Shires, Tom, and O'Banion, John: *Successful Treatment of Massive Air Embolism Producing Cardiac Arrest,* J.A.M.A. 167:1483-1484 (July 19) 1958.

Speidel, Thomas H.: *The Case of the Missing Catheter,* Am. J. Obst. & Gynec. 76:558-560 (Sept.) 1958.

Sparr, Richard A., and Pritchard, Jack A.: *Maternal and Newborn Distribution and Excretion of Sulfamethoxypyridazine (Kynex),* Obst. & Gynec. 12:131-134 (Aug.) 1958.

Sparkman, Robert S.: *Rupture of the Spleen in Pregnancy,* Am. J. Obst. & Gynec. 76:587-598 (Sept.) 1958.

Sutow, Wataru W.: *Prognosis in Neuroblastoma of Childhood,* A.M.A. Am. J. Dis. Child. 96:299-305 (Sept.) 1958.

Thanisch, George: *Multiple Hepatic Abscesses due to Ascaris Lumbricoides,* J. Pediat. 53:602-607 (Nov.) 1958.

Tschumy, William, Jr.: *Pulmonary Infiltration with Eosinophilia (Loffler's Syndrome) Due to Smoke Inhalation: Report of a Case and Comment on Pathogenesis,* Ann. Int. Med. 49:665-672 (Sept.) 1958.

Withers, Ben T.: *A Technique for Using Preserved Autogenous Skin in Otologic Grafting,* Ann. Otol., Rhin. & Laryng. 67:341-347 (June) 1958.

Wright, William K.: *Surgical Closure of Perforated Tympanic Membrane by Skin Grafting,* Eye, Ear, Nose & Throat Month. 37:671-673 (Oct.) 1958.

Whitney, John M.: *Disaster Management,* Mil. Med. 123:181-188 (Sept.) 1958.

Gifts to the Library

Dr. T. J. Archer, Jr., Austin, 87 journals.

Board for Texas State Hospitals and Special School, Austin, 1,739 journals.

Dr. Charles H. Brownlee, Austin, 21 books.

Dr. Lee Edenes, Austin, 3 journals.

Dr. J. E. Johnston, Austin, 5 journals, 16 reprints.

Dr. Samuel N. Key, Jr., Austin, 10 journals.

Dr. R. G. McCorkle, Austin, 2 books.

Dr. Morris E. Malakoff, Laredo, 265 journals.

Dr. William P. Morgan, Austin, 542 journals.

Dr. H. W. Newman, Austin, 77 journals.

Dr. Morris Polsky, Austin, 21 journals.

Dr. C. A. Selby, Sinton, 314 journals, 19 reprints.

Dr. A. A. Tisdale, Austin, 12 journals.

Dr. Edward Zidd, Austin, 350 journals.

★ Motion Pictures

Bedside Management of Fluid Balance Problems

16 mm., color, sound, 20 minutes, 1958.

This film shows the simple bedside tests for blood and urinary electrolytes that are now available. These tests permit the physician to solve complex fluid-electrolyte problems promptly and without the facilities of a medical center. A physician is followed step by step in his management of a difficult case, using these bedside techniques.

The Medicine Man

16 mm., black and white, sound, 27 minutes, 1958.

Millions of Americans are influenced by nutritional products of questionable merit, and this film shows what can happen to one family if its members fall for the food fad idea.

Recognition and Management of Respiratory Acidosis

16 mm., color, sound, 30 minutes, 1958.

The course of a fatal case of respiratory acidosis is illustrated and discussed by a panel. The etiology and symptoms of this condition are examined in detail, and the importance of early recognition is emphasized. A suggested treatment program, including emergency treatment of acute cases, is outlined fully. The use of various types of pressure breathing apparatus is demonstrated with patients.

★ Books

Books Newly Acquired

Bettmann, Otto L.: *Pictorial History of Medicine,* Springfield, Ill., Charles C Thomas, 1956.

Egerter, B. C.: *Professional Practice Management,* New York, Pageant Press, 1957.

Faust, Ernest Carroll: *Animal Agents and Vectors of Human Disease,* Philadelphia, Lea and Febiger, 1955.

Marti-Ibañez, Felix: *Men, Molds, and History,* New York, MD Publications, Inc., 1958.

Modell, Walter, and Schwartz, Doris R.: *Handbook of Cardiology for Nurses,* ed. 3, New York, Springer, 1958.

Nasset, Edmund Sigurd: *Food and You,* ed. 2, New York, Barnes and Noble, 1958.

Raven, Ronald W.: *Cancer,* vol. 4, *Clinical Aspects,* London, Butterworth and Co., 1958.

Ravin, Abe: *Auscultation of the Heart,* Chicago, Year Book Publishers, 1958.

Reese, Dorothy Erickson: *How to Be a Nursing Aid in a Nursing Home,* Washington, American Nursing Home Association, 1958.

Strean, Lyon P.: *Birth of Normal Babies,* New York, Twayne Publishers, 1958.

United States Department of Defense: *Emergency War Surgery,* U. S. Armed Forces issue of NATO handbook prepared for use by the medical services of NATO Nations, Washington, D. C., U. S. Government Printing Office, 1958.

Veirs, Everett: *So You Have Glaucoma,* New York, Grune and Stratton, 1958.

Book Notes

Surgeons All

HARVEY GRAHAM, M.D., foreword by OLIVER ST. JOHN GOGARTY. 459 pages. $10. New York, Philosophical Library, 1957.

For the young or older surgeon, this work will prove to be instructive and entertaining. For the older surgeon who wishes to look back, or the young doctor just starting, it is an excellent introduction to the history of surgery.

In Dr. Gogarty's introduction he says, "This is the best book on surgery I have ever read . . ." This is a story book—a story of surgery itself made up of a thousand and one surgeons who helped to bring the surgical art to its present stage of development.

Fundamentals of Clinical Neurophysiology

PAUL O. CHATFIELD, M.D., Formerly Chief, Section of Clinical Neurophysiology, National Institute of Neurological Diseases and Blindness, National Institutes of Health, Bethesda, Md.; Formerly Assistant Professor of Physiology, Harvard Medical School, Boston. 392 pages. $8.50. Springfield, Ill., Charles C Thomas, 1957.

The author presents this book as a one man exposition of the better established facts of neurophysiology. The material has been gathered over a period of years of teaching physiology at Harvard Medical School. The author explains the unevenness of his emphasis on the various subjects treated as the result of his unconsciously treating more thoroughly those aspects of neurophysiology in which he was more interested. He has deliberately omitted the peripheral autonomic nervous system and physiological psychology.

The author begins with a general introduction and follows with a discussion of the basic mechanisms of the functioning nervous system. The fundamentals are presented in a clear and concise manner. Each chapter begins with a list of topics to be discussed and is completed with an adequate bibliography. This makes it of particular interest to medical students, trainees in neurology and psychiatry, and technical personnel who have just entered the field.

Surgery in World War II, Orthopedic Surgery In the Mediterranean Theater of Operations

OSCAR P. HAMPTON, JR., M.D., F.A.C.S., Col., MC, USAR, Assistant Professor of Clinical Orthopedic Surgery, Washington University School of Medicine, St. Louis; JOHN B. COATES, JR., Col., MC, Editor in Chief. 368 pages. Washington, Office of the Surgeon General, Department of the Army, 1957.

This well illustrated book on orthopedic surgery in the Mediterranean theater is based on hard experience in the field under trying conditions and lays down principles that will save many lives and save function of many extremities in any future actions. Because of the reviewer's own experiences, he was much interested in the historical account of the development of the consultant system and the laying down in rather clear and concise form the function, duties, and responsibilities of a consultant. It is timely reading and would be of interest to anyone about to undertake such duties and responsibilities.

The discussions of facilities, wound appraisal, management of compound fractures, and fracture management in general is well dealt with. The analysis of cases is enlightening, and the techniques employed reflect the resourcefulness of our medical men in time of stress and need. The graphic portrayal and the well selected illustrations emphasize the gravity and importance of the proper management and treatment of fractures and wounds.

Space does not permit a complete presentation of the many helpful ideas incorporated in this volume. It is recommended reading for anyone who deals with severe injuries of the skeletal system.

—Joe C. Rude, M.D., Austin.

And Live Alone; The Story Of a Year in New Hampshire

DOROTHY PITKIN, 214 pages. $3.50. New York, Pantheon Books Inc., 1957.

Pre-Employment Disability Evaluation

WILLIAM A. KELLOGG, M.D., F.A.C.S., Clinical Professor of Surgery, New York Polyclinic Post-Graduate Medical School, New York. Preface by H. L. Herschensohn, M.D., Medical Director, Douglas Aircraft Co., Inc., Santa Monica, Calif. $10.50. 155 pages. Springfield, Ill., Charles C Thomas, 1957.

This book is described as a manual for reference regarding preemployment examination and is a complete manual of its type. The pages are perforated and punched for insertion in a ring-binder if desired. The bound volume form in which it is presented seems practical and desirable.

The opening chapter deals with the advantages and purposes of a pre-employment examination. Some may prefer to speak of the examination as a preplacement examination. Where the diseased and disabled are considered for employment, preplacement seems a more desirable term. The various systems are considered in detail by chapters in the manual, and some chapters deal with diseases, external agents, and constitutional conditions. A special chapter on restrictions is of interest, and various restrictions and disabilities are classified. The paragraphs on restrictions are referred to by code number frequently in other chapters of the manual. The application of restrictions to an examinee as a substitute for rejection is discussed. This type of handling is, at times, helpful, for the personnel department may then inform the applicant that there is no suitable job available, and the applicant is spared the label of "rejected."

The medical forms outlined are of interest, but it should be remembered that no one group of forms is suitable to all types of industry.

State compensation laws, as applied to various conditions aggravated by certain types of work, should be kept in mind. Also, recognition of employee insurance plans should be considered when applicants with chronic diseases are employed with restrictions. Some medical examiners for industry would take exception to the author's concept of "blood pressure 170/100" as an acceptable level on preemployment examination.

This is a complete type of manual on the subject, and the author has given considerable time and thought in compiling it. It would be of value as a reference to many physicians who examine applicants for employment with industries which have a wide variety of jobs and which would be willing and able to utilize the abilities of the many persons who are productive, though handicapped.

—H. O. Sappington, M.D., Baytown.

A Mental Health Handbook

IAN SKOTTOWE, M.D., M.R.C.P., D.P.M., Psychiatrist, Warneford and Park Hospitals. 196 pages. $5.50. London, Edward Arnold, Ltd., 1957.

The author indicates that the book is for the training of people in the mental health field and particularly in regard to the National Health Service in Great Britain. Much of the content would not be relevant to the situation in the United States but pertains, rather, to English mental health legislation and situations. Much of the material is superficial, in light of the extent of present day knowledge. More of the material is obsolete or is overly general.

There are many technical points which are controversial and difficult to accept. For example, on page 144, Dr. Skottowe states that physical anthropometry of all school children is indicated as a reliable way of indicating the children who are "constitutionally vulnerable." There are many other adverse criticisms which could be made in regard to the book.

—John A. Boston, Jr., M.D., Austin.

Lens Materials in the Prevention of Eye Injuries

ARTHUR HAIL KEENEY, M.D., D.Sc., Section of Ophthalmology, University of Louisville School of Medicine, Louisville, Ky. 73 pages. $3.50. Springfield, Ill., Charles C Thomas, 1957.

As medicine and associated sciences are engaged in preventing mechanical eye injuries, this small book assists in a better understanding of the problems confronted in the development of safety lenses and a better understanding of the best lens to prevent these eye injuries. The technical developement begins with the wire gauze and plain glass and ends with the current lenses processed on a compression-tension ratio basis. Also, there are examples of various fracture patterns and the part that lens power plans on the hardness and impact resistance of the safety lens. Plastic safety lenses are also included along with the advantages and disadvantages. There is a concise chapter which will be of great practical assistance concerning specific indications and contraindications for the various lens materials prescribed.

This book should be read by all ophthalmologists because the scope of protective eye wear extends beyond industry to every parent and child.

—Bloyce H. Britton, M.D., El Paso.

Expectant Motherhood

NICHOLSON J. EASTMAN, M.D., Professor of Obstetrics, Johns Hopkins University. 198 pages. ed. 3. $1.75. Boston, Little, Brown and Co., 1957.

This is an excellent book suitable for the intelligent, prenatal patient; therefore, I will criticize it sharply. It is worth saving—worth improving!

The author writes authoratively and is readable but verbose in certain areas, particularly in embryology and dietetics. The modern busy housewife with a cake in the oven could be spared considerable of the prose without loss of information.

In the chapter on weight control, the psychiatric aspects of overweight, namely depression and boredom, were not emphasized. The importance of eating only at the table with others and of not eating after the evening meal was omitted.

The author does not recognize that the edema of toxemia is not caused by sodium retention, is not prevented by low sodium diet, and, I would like to add, not prevented or cured by Diuril.

The author does not recognize that hemolytic disease of the newborn is equally frequent in the Rh positive mother as in the Rh negative.

In the care of the nipples, excessive washing and all soap should be avoided, and boric acid is a poisoning hazard that should be deleted entirely from the nursery.

Some of the illustrations are excellent. Today we expect better illustrations in full color. I did not get the significance of the cup measure.

—W. E. Lockhart, M.D., Alpine.

Chemistry and Biology and Mucopolysaccharides

Ciba Foundation Symposium, edited by G.E.W. WOLSTENHOLME, M.B., B.Ch. and MAEVE O'CONNOR, B.A. 323 pages. $8.50. Boston, Little, Brown and Company, 1958.

Neomycin; Its Nature and Practical Application

SELMAN A. WAKSMAN, Editor; Hubert A. Lechevalier and Burton A. Waisbren, Associate Editors; Robert A. Day, Assistant Editor. 412 pages. $5. Published for the Institute of Microbiology, Rutgers University. Baltimore, Williams and Wilkins Company, 1958.

★ Texas Medical Association

Amendments to Constitution Will Be Considered in April

Several constitutional changes introduced at the 1958 annual session of the Texas Medical Association will be considered for final action by the 1959 House of Delegates meeting April 18-21 in San Antonio.

The Board of Councilors, in its recommendations on intern, resident, inactive, and honorary memberships, asked for the following change in paragraph 3, section 1, article II of the Constitution:

"It is also provided that physicians who are serving internships and residencies in hospitals, as a part of their educational qualifications, and who are not in private practice, may be elected by county societies when the hospital is located within the geographical boundaries of said county society or societies as 'intern members' or 'resident members,' such membership to terminate with the completion of the internship or residency. When so elected, intern or resident members shall be entitled to all of the privileges of membership in the Association, except the right to vote, hold office, endorse applications for membership, or serve as a delegate or alternate delegate to the Texas Medical Association, provided that they pay the annual dues as required in the By-Laws and that their names are duly reported in the annual reports of the county societies."

In order to provide a means whereby regular members may become inactive when they leave the private practice of medicine for further training, the Board of Councilors recommended that the following paragraph be added to section 1, article II of the Constitution:

"It is also provided that county medical societies may elect to temporary inactive membership those physician members who leave the active practice of medicine for further training by serving internships or residencies in hospitals for a proposed period of one year or more. Such membership will terminate with the completion of the training, and the member will return to regular membership."

In clarifying the qualifications for honorary membership, the Board of Councilors asked that paragraph 1, line 10 of section 1, article II of the Constitution should end with the word "association," and that the remainder of the paragraph, rewritten as paragraph 2, should be changed as follows:

"It is provided that the House of Delegates, upon nomination of component county societies, may elect to honorary membership those physician members of honorable standing who, because of age or other laudable reasons, have reached a point of comparative inactivity in the practice of medicine, and who have been members of organized medicine for a period of at least forty years or who have contributed notably to the advance of ethical medicine. When so nominated and elected, said honorary members shall be entitled to all of the privileges of membership as

set out in this Constitution and By-Laws; provided that county society secretaries shall include all such honorary members in their respective annual reports, with such notation thereon as will at once declare their status."

Other changes which will be considered include Resolution 18i, which was presented in 1958 by Dr. E. P. Hall of Fort Worth. This resolution will provide that "In case of a vacancy in any elective office of the Texas Medical Association, this vacancy can only be filled by vote of the House of Delegates either in regular or special session."

Also presented by Dr. Hall was resolution 18j, which calls for an increase of the members of the Board of Trustees to nine.

The Travis County Medical Society presented Resolution 18q calling for a new classification of membership and dues for physicians who are associated with state eleemosynary institutions, the State Department of Health, the veterans hospitals, and similar groups.

Another resolution which will be considered is Resolution 18l, presented by the Hidalgo-Starr Counties Medical Society, which requires American citizenship as part of the eligibility of applicants for membership in the Texas Medical Association.

Scientific Exhibits Being Readied

Displays for the scientific exhibit of the Texas Medical Association are being prepared for a triple purpose this year, Dr. J. Edward Johnson of Austin, chairman of the Committee on Scientific Exhibits, says.

First, the exhibits will serve as a "showcase of Texas medicine" to let visitors at the session learn new techniques and special studies that have been developed by their professional colleagues. Second, the exhibits will be eligible—as in previous years—for official awards in individual, group, institutional, and educational-promotional categories. Third, for the first time this year, an unofficial "popularity poll" will permit viewers to cast their ballots for their choices of displays which to them are of greatest interest and value, and the results of this poll will be announced along with the official awards granted by a judging committee appointed by the President.

Applications for scientific exhibit space are being accepted now, and inquiries should be addressed to Dr. Johnson at 1801 North Lamar Boulevard, Austin. The deadline for applications is January 25. Although efforts will be made to provide space for exhibits thereafter, no assurance exists that they can be accepted, nor, if accepted, that information about them can be included in the printed program.

Most exhibits will be housed on the mezzanine floor of the Hilton Hotel in San Antonio, headquarters for the annual session April 18-21.

Accreditation Institute for Hospitals Set

An accreditation institute sponsored jointly by the Texas Hospital Association, Texas Medical Association, Private Clinics and Hospitals Association, and Texas Association of Medical Record Librarians is scheduled February 19-20 at the Roosevelt Hotel in Waco. Theme for the institute is "Responsibility for Accreditation."

Fee for the institute is $10 per hospital, which entitles the hospital to an unlimited number of registrants. Application may be made to the Texas Hospital Association, 2208 Main Street, Dallas 1.

★ County Societies

Medical Good Will Comes Via Bowling Alley, Weight Scales

A bowling league, a campaign to measure the waistline, a conventional dinner party—these and a variety of other projects have been employed by county medical societies throughout Texas in establishing better public relations for the medical profession. In one instance, results of a community project were so successful that the project was given statewide as well as national recognition.

From the building of closer relationships within each society to working with the community as a whole or with other professional groups, county societies have covered different phases of public relations in their efforts. In each case, however, better understanding with the working group was accomplished and the feeling toward doctors was improved.

Start at Home

With the thought that public relations often begins best when it begins at home physicians from Guadalupe, Comal, and Hays Counties pooled their efforts in establishing a Tri-County Medical Assembly, an idea which physicians from these counties think could be employed satisfactorily by other counties where the number of doctors is small. The assembly, which meets quarterly, is an informal relationship which does not infringe on the respective regular county organizations. It brings physicians together who are related from a geographical and patient practice standpoint. Programs for the assembly usually include a social hour and dinner followed by a talk on some scientific subject. The establishment of the assembly has enabled better professional education and better social relationships to be developed, doctors of these communities say.

Community Comes Next

Having the youth of the community in mind, members of the Webb-Zapata-Jim Hogg Counties Medical Society have undertaken different projects during the past 2 years. The society sponsored a regulation banning the use and sale of fireworks, reducing the injuries from firecracker explosions. They also submitted an ordinance to the city council prohibiting the abandonment of empty ice boxes and cabinets in vacant lots and backyards within the city limits to prevent children from entering these boxes and cabinets and dying of asphyxia. Members of the society also gave free physical examinations for members of the Boy Scouts and other youth groups and gave demonstrations of methods of artificial respiration at local swimming pools. Two physicians are always in attendance at golden glove fights, ready to administer first aid or give complete physical examinations to the boys before they enter the ring. The society sponsored a Babe Ruth League baseball team called the "Medics," which was publicized through the newspapers, radio, and television. Every year, they sponsor a racer at the local soap-box derby. The society is now working with the school district in developing a compulsory driver training course for all high school students.

Many times, a general opinion of one doctor and consequently of the entire medical profession may be formed as a result of a single unpleasant incident. And many times the availability of a physician at the time of emergency can

sway the public mind. Acting on this concept, physicians of the Ellis County Medical Society, like other societies in the state, improved their standing in the community by developing a rotating system in the local hospital emergency room. By all physicians taking turns doing a week of emergency room work, a doctor is available at all times and patients whose own physicians are not available or who do not have a preference for any doctor do not suffer from lack of immediate medical care.

In the idea stage yet, but probably to become an active project in 1959, is the plan of members of the Brazoria County Medical Society of organizing an education program of motion picture showing to lay groups, at the same time providing the services of one of the society's members for comments and to answer questions. Thus far, films have been reviewed; a list of lay organizations holding meetings which have need for program material is being compiled. Equipment for the showings is to be furnished by the society.

Ideas with Multiple Results

Public relations projects can be geared to produce multiple results. This has been the case with several of the societies, whose projects have affected community as well as interprofessional relations. Working in cooperation with the *Dallas Times Herald,* the Dallas Pharmaceutical Association, and Smith, Kline, and French Laboratories, the Dallas County Medical Society sponsored a "Dallas Fights Its Waistline" week in January, 1958. The project, which received statewide and national publicity, was undertaken as a public service health education program aimed at urging overweight citizens to consult with their physicians about their weight problems. Coverage was given to the campaign through the news and advertising columns, radio and television stations, billboards, paper posters on trucks, newsstands, and buses, and leaflets and bookets. A film on overweight was shown to different groups in the community and an exhibit was set up in the Dallas Health Museum. Scale booths were placed in banks, hotels, a medical office building, and department stores. A 1 hour television panel show of physicians who answered viewers' questions on weight climaxed activities for the week.

Newspaper people, officials of the Potter-Randall Counties Medical Society say, eventually learn of every action in their community, and rumor or irresponsible talk can create a story with a wrong slant. To avoid such a situation, members of the society worked out a successful and friendly relationship with the local press, through which a newspaper reporter is present at the meetings of the society to learn firsthand what goes on. Projects and other activities of the society have received a considerable amount of publicity, and misunderstandings have been avoided by going to the reporter beforehand and explaining the situation. A weekly health column is also published in one of the newspapers. Through the efforts of the physicians in these counties and of other leading citizens, work toward obtaining a proposed Amarillo Medical Center has progressed rapidly. The center, which is estimated to cost from $30,000,000 to $50,000,000, will include among other things, an 800 bed hospital, a school of nursing, medical school buildings (if one is built in the Amarillo area), a public health center, a blood center, a nursing home for the aged, a medical library, and a headquarters building for the county medical society.

The Harris County Medical Society has found that observance of Medical Education Week can be advantageous. Working with the Professional Pharmaceutical Representatives of Harris County, Baylor University College of Medicine, University of Texas Postgraduate School of Medicine, M. D. Anderson Hospital and Tumor Institute, and the local press, the society's members focused attention on the ever increasing contribution of medicine to American life and on the basic significance of medical education. One of the phases of the project was setting up a speakers bureau through which civic clubs could obtain a panel of three speakers for their meetings. The panels discussed the undergraduate, graduate, and continuing aspects of education and were composed of a representative from Baylor, the postgraduate school, and the society. Another phase was the presentation of a half hour television program entitled "The Eternal Student." The movie carried the viewer through the activities of the Harris County medical community and medical center, a typical medical convention, and showed the various phases of medical education at Baylor University College of Medicine, the University of Texas Postgraduate School of Medicine, and M. D. Anderson Hospital and Tumor Institute.

Among Other Professions

The promotion of good will among other professional groups was made possible by the Bexar County Medical Society in sponsoring the organization of a bowling league this past year. Eight teams were formed by doctors, dentists, druggists, and detailmen. Ten teams are being planned for 1959. Getting together on this informal basis has made it possible for better relationships to be developed, a representative of the society said. The teams have proved to be popular among the physicians, and a number of men were not placed on teams because of limited space.

Members of the Denton County Medical Society improved their professional relations by inviting representatives of the local dental, bar, and ministerial associations to speak at several of their monthly meetings. These meetings were so successful that later the entire dental society and

Dr. Joe A. DeGasperi, San Antonio, is vice-president of the Professional Medical Bowling League of doctors, dentists, druggists, and detailmen in Bexar County. Richard Teniente and Homer Lamey, both pharmacists, are president and secretary-treasurer.

their wives were guests of the society at cocktails and dinner. A similar function was held with the local bar association. The most recent event was a banquet honoring the officers of local state welfare offices, city and county school nurses, lay officers of the local cancer, heart, tuberculosis, and poliomyelitis associations, and representatives of the news and radio services.

Whether from large or small communities, most physicians agree that concepts such as "doctors are snobs," "doctors don't like outsiders in their immediate circles," and "doctors are difficult to work with" often stem from a lack of understanding. But usually a little effort on the part of the physician, either working individually or with the county medical society as a whole, these doctors observe, will pay off many times over in the amount of understanding and good will that results and in the amount of cooperation that comes with such a relationship.

County Societies Elect Officers

County medical societies in Texas have announced the following officers for 1959:

Austin-Waller.—President-elect, Dr. Winston B. Nealy, Bellville; vice-president, Dr. Virgil Gordon, Sealy; secretary-treasurer, Dr. M. G. Bolton, Hempstead; and delegate, Dr. H. E. Roensch, Bellville. Dr. Dallas D. Miles of Waller became president.

Bastrop-Lee.—President, Dr. Robert W. Loveless, Bastrop; vice-president, Dr. Roy H. Morris, Elgin; secretary-treasurer, Dr. Alford R. Hazzard, Giddings; and delegate, Dr. James W. Thomas, Smithville.

Bexar.—President-elect, Dr. J. J. Hinchey; vice-president, Dr. Leon C. Kopecky; secretary, Dr. Mary M. Henry; treasurer, Dr. Dan A. Russell, Jr.; and delegates, Dr. J. L. Cochran, Dr. Jack B. Lee, Dr. A. F. Clark, Jr., Dr. Arthur C. Ressmann, Dr. Jack M. Partain, and Dr. John H. Bohmfalk, all of San Antonio. Dr. Walter Walthall took over as president.

Bosque-Hamilton.—President-elect, Dr. Russell D. Holt, Meridian; secretary-treasurer, Dr. Robert A. Kooken, Hamilton; and delegate, Dr. Van D. Goodall, Clifton. Dr. Charles C. Cleveland, Hamilton, took over the presidency.

Brown-Comanche-Mills-San Saba.—President, Dr. Lee K. Ory, Comanche; vice-president, Dr. Henry L. Lobstein, Brownwood; secretary, Dr. Patrick T. McGowan, Brownwood; and delegate, Dr. S. Braswell Locker, Brownwood.

Caldwell.—President, Dr. William G. Robertson, Jr., Luling; secretary-treasurer, Dr. P. A. Wales, Lockhart; and delegate, Dr. Otho K. DuBoise, Lockhart.

Dallas.—President-elect, Dr. Lester H. Quinn; vice-president, Dr. Charles M. Cole; secretary, Dr. Willard C. Sellman, Jr., Dallas; treasurer, Dr. George N. Aldredge, Jr., Dallas; and delegates, Dr. Barton E. Park, Dr. George V. Launey, Dr. John S. Chapman, Dr. Arnott DeLange, Dr. Glenn D. Carlson, Dr. Guy T. Denton, Jr., Dr. Ridings E. Lee, Dr. David W. Carter, Jr., Dr. Frank H. Kidd, Jr., Dr. George M. Jones, and Dr. Oscar M. Marchman, Jr., all of Dallas. Dr. Floyd A. Norman, Dallas, became president.

Dallam-Hartley-Sherman-Moore.—President, Dr. O. J. Richardson, Dumas; vice-president, Dr. Fred A. Elston, Sunray; secretary-treasurer, Dr. Jim E. Wheeler; and delegate, Dr. Byron W. Wright, Dumas.

Grayson.—President, Dr. John M. Hardy, Sherman; vice-president, Dr. Stanley L. Clayton, Denison; secretary-treasurer, Dr. A. M. Boyd, Sherman; and delegate, Dr. Rene G. Gerard, Denison.

Harris.—President-elect, Dr. Donald M. Gready; vice-president, Dr. William E. Sharp, Houston; secretary, Dr. William H. Moorhead, Houston; treasurer, Dr. Calvin A. Calhoun, Houston; and delegates, Dr. William E. Sharp, Dr. S. W. Thorn, Dr. W. H. Hamrick, Dr. George W. Waldron, Dr. C. Forrest Jorns, Dr. J. Stanley Oliver, Dr. Bill Robins, Dr. T. J. Vanzant, Dr. T. P. Kennerly, Dr. H. T. Barkley, Dr. William F. Renfrow, Dr. J. G. Heard, Dr. Thomas L. Royce, and Dr. Charles D. Reece, all of Houston.

Hunt.—President-elect and vice-president, Dr. Robert F. Jones, Commerce; secretary-treasurer, Dr. Henry E. Mehmert, Greenville; delegate, Dr. Lowell H. Leberman, Commerce. Dr. Richard H. Fair, Greenville, became president.

Jefferson.—President-elect, Louian C. Carter, Port Arthur; vice-president, Dr. H. Grady Bevil, Beaumont; secretary-treasurer, Dr. John M. Travis, Jr., Beaumont; and delegates, Dr. Carter and Dr. James B. Ivers, Beaumont; and Dr. John M. White, Jr., Port Arthur.

Kerr-Kendall-Gillespie-Bandera.—President, Dr. George D. Meador, Bandera; secretary, Dr. Luise C. Brandenstein, Kerrville; treasurer, Dr. Dan W. Bacon, Kerrville; and delegate, Dr. D. R. Knapp, Kerrville.

Lamb-Bailey-Hockley-Cochran.—President, Dr. Fredric B. Faust, Earth; vice-president, Dr. Ralph E. Maurer, Littlefield; secretary-treasurer, Dr. Andrew L. Walsh, Levelland; and delegate, Dr. I. T. Shotwell, Littlefield.

Medina-Uvalde-Maverick-Val Verde-Edwards-Real-Kinney-Terrell-Zavala.—President, Dr. George M. Allison, Uvalde; vice-president, Dr. John C. Spencer, Crystal City; secretary-treasurer, Dr. George H. Herrmann, Del Rio; delegate, Dr. Dean P. Dimmitt, Uvalde.

Nacogdoches.—President, Dr. James I. Allen, Nacogdoches; vice-president, Dr. Eugene S. Rogers, Nacogdoches; secretary-treasurer, Dr. Matthew J. Buchele, San Augustine; and delegate, Dr. J. Frank Beall, Nacogdoches.

Orange.—President, Dr. Wilson E. James; vice-president, Dr. Robert A. Ingram; and secretary-treasurer, Dr. Robert F. Minkus, all of Orange.

Pecos-Jeff Davis-Presidio-Brewster.—President, Dr. George P. Hoffman, Fort Stockton; vice-president, Dr. John W. Pate, Alpine; secretary, Dr. John C. Hundley, Fort Stockton; Dr. Charles E. Oswalt, Jr., Fort Stockton; and delegate, Dr. D. J. Sibley, Jr., Fort Stockton.

Washington-Burleson.—President, Dr. Joel H. Johnson, Brenham; vice-president, Dr. George V. Pazdral, Somerville; secretary-treasurer, Dr. C. E. Southern, Brenham; and delegate, Dr. Pazdral.

★ District Societies

Twelfth District Society Sponsors Symposium on Trauma

The Twelfth District Medical Society held a symposium on trauma at its fall-winter meeting, January 13, in Marlin. Presentations were given by the faculty of Baylor University College of Medicine, Houston.

The program included the following subjects: care of patient with multiple injuries, craniocerebral injuries, chest trauma, trauma to the upper extremity, neck, and back, hand injuries, lower extremity trauma, post-traumatic renal insufficiency, cardiovascular trauma, burns, spinal cord injuries, and abdominal trauma.

Mrs. John D. Gleckler, Denison, President, Woman's Auxiliary to the Texas Medical Association, was guest speaker for a meeting of district auxiliary.

★ Woman's Auxiliary

Fairs Stimulate Interest In Science Careers

Scientists and engineers are essential for a nation's progress and survival in an atomic age. Aggressive and competitive countries are doing an effective job of training scientists at an almost feverish pace. Yet the report of a survey made by the Educational Branch of the American Museum of Atomic Energy, Oak Ridge, Tenn., reveals that since 1950 the number of college graduates qualified to teach science and mathematics in the United States has decreased 53 per cent and the present need for new science teachers exceeds 7,000.

To provide an opportunity for the scholarly student to receive recognition and gain prestige and to dramatize and glamorize science—including biological and medical science—for students about to select careers, national and state science fairs are being conducted. The Woman's Auxiliary to the Texas Medical Association, with the approval of the Association, is helping to promote such fairs.

Science Clubs of America of Washington, D. C., has conducted nine annual national science fairs for winners of state fairs. In 1950 the first state fair for science in Texas was held in Fort Worth. There were only 20 entrants then. The top winner of that fair is now in Wisconsin on a special grant.

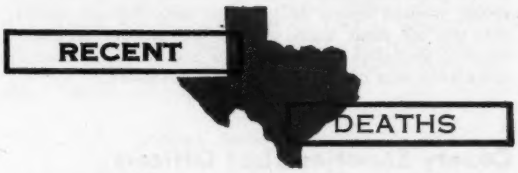
Students and educators are directly concerned with science fairs, but all members of a community can be involved. The fairs have public relations value for the doctor who takes an interest. He may assist students by guiding them in their research and transmitting some of his own enthusiasm for medicine and science while working with them. He also can serve as a science fair judge. By its support, the Auxiliary can become identified with a worth-while community project and perhaps thereby parents and educators may become aware of the Auxiliary for the first time and develop a new appreciation of its work.

In many states industry, insurance, newspapers, radio, and banking are cooperative in fair planning for American youth. From the first the American Medical Association has awarded honors at the national level to students preparing for careers in science, and last year the Navy, Air Force Association, and Army awarded honors to the national winners. The national science fair offers four first awards valued at $125 each, four second awards at $75 each, four third awards at $50 each, and fourth awards at $25 each for up to 25 per cent of remaining finalists.

The science fairs are not an end in themselves. The aim is to stimulate better teaching and attract more students to become science majors. Exhibits promote exchange of materials and ideas as well as reward participants for work well done.

Medical societies or auxiliaries can initiate a local fair after obtaining a handbook from Educational Section, American Museum of Atomic Energy, P. O. Box 117, Oak Ridge, Tenn. Wayne Taylor, Ph.D., of the Division of Extension of the University of Texas, Austin, may be consulted concerning plans for a science fair in any county.

Officers of the Woman's Auxiliary to the Texas Medical Association for 1958-1959: President, Mrs. John D. Gleckler, Denison; President-Elect, Mrs. Haskell D. Hatfield, El Paso; First Vice-President, Mrs. William D. Nicholson, Freeport; Second Vice-President, Mrs. G. G. Passmore, San Antonio; Third Vice-President, Mrs. Ralph B. Payne, Amarillo; Fourth Vice-President, Mrs. G. V. Brindley, Jr., Temple; Fifth Vice-President, Mrs. George M. Hilliard, Jacksonville; Treasurer, Mrs. Andrew J. Magliolo, Dickinson; Recording Secretary, Mrs. Thomas J. Vanzant, Houston; Corresponding Secretary, Mrs. Rene G. Gerard, Denison; Publicity Secretary, Mrs. James M. Coleman, Austin; Parliamentarian, Mrs. Truman C. Terrell, Fort Worth; Executive Secretary, Miss Hazel Casler, Austin.



DR. J. H. BLACK

Dr. James Harvey Black, practicing allergist and professor of clinical medicine at University of Texas Southwestern Medical School, Dallas, died November 30, 1958, after a heart attack at Highland Park Presbyterian Church.

Born in Huntington, W. Va., on March 27, 1884, he was the son of John Adam and Mary Nancy (Murphy) Black. Doing undergraduate work at Southwestern University in Georgetown, he later attended the College of Physicians and Surgeons in Atlanta, Ga., and was graduated from the Southern Methodist University Medical School at Dallas in 1907. He served an internship at St. Paul's Hospital in Dallas and did postgraduate work at Montreal General Hospital, Montreal, Canada; at the research laboratory of the New York Board of Health, New York; and at the Philadelphia General Hospital, Philadelphia.

From 1907 to 1915 he was professor of bacteriology and pathology at the Southern Methodist University Medical School and was dean of that school in 1914 and 1915. He was professor of bacteriology and pathology, preventive medicine, and clinical medicine at Baylor University College of Medicine, then in Dallas, from 1915 to 1942. Since 1942 he had been a professor at Southwestern Medical School. Dr. Black also maintained a private practice in clinical pathology from 1907 until 1932, when he limited his practice to allergies.

A member of the Texas Medical Association through the Dallas County Medical Society, Dr. Black was chairman of the Section on Clinical Pathology for the Association in 1938. Dr. Black was president of the American Society of Clinical Pathologists in 1929-1930 and of the National Association for the Study of Allergy in 1934. A fellow of the American College of Physicians, he was a member of the American Academy of Allergy, serving as president for that organization in 1934-1935. He was certified in allergy by the American Board of Internal Medicine. Dr. Black was a member of the American Medical Association and was chairman of the Section on Pathology and Physiology for that group in 1931-1932. Since 1945 he had been editor of the Allergy and Biological Abstracts section of the *Journal of Allergy*, and during his professional career had written approximately 70 medical papers for various journals. He was the co-author of "Practice of Allergy" and "Primer of Allergy." He also belonged to the Southern Medical Association, Texas Society of Pathologists, Texas Academy of Internal Medicine, Southwest Allergy Forum, and New York Academy of Science.

DR. J. H. BLACK

He held memberships in the Doctors Luncheon Club, Rotary Club, Masons, Town and Gown Club, Dallas Council on World Affairs, Dallas Chamber of Commerce, Better Business Bureau, Kappa Alpha fraternity, Theta Kappa Psi fraternity, Dallas Athletic Club, and Texas Philosophical Society. He was an elder of the Highland Park Presbyterian Church and teacher of the Westminster Sunday School Class.

Dr. Black and the former Miss Alleen Marie Patton of Catlettsburg, Ky., were married in September, 1913. She survives as do two daughters, Mrs. Armand Garguilo of New York and Mrs. J. W. Crosland, Jr., of Dallas; two sisters, Mrs. Virgil Gillespie and Miss Annette Black, both of Dallas; and three grandchildren.

DR. HERMAN W. JOHNSON

Dr. Herman W. Johnson, professor emeritus of obstetrics and gynecology at Baylor University College of Medicine in Houston, died of eneurysm and pneumonia on November 14, 1958, in Buffalo, N. Y., where he had lived since his retirement 2 years ago.

Born in Andover, Vt., in 1883, he was reared in Gowanda, N. Y., and received his degree of doctor of medicine from the University of Buffalo College of Medicine in 1905. He interned at Danemora State Hospital for Insane Convicts and practiced at Gowanda for 12 years before joining the United States Army in World War I. After finishing his military service, Dr. Johnson went to Houston in 1920 and before his retirement had been on the staff of every hospital in that city, delivering more than 15,000 babies while in medical practice. Dr. Johnson served as chairman of the Department of Obstetrics and Gynecology at the Baylor medical school and was nationally known for his work in the field of obstetrics. He was the author of the book, "Reminiscences of a Male Midwife," and his hobby was fishing.

A member of the Harris County Medical Society, and the American Medical Association, he was elected to honorary membership in the Texas Medical Association in 1953. He was a diplomate of the American Board of Obstetrics and Gynecology, a fellow of the American College of Surgeons, and a member of the American Association of Obstetricians and Gynecologists and of Alpha Omega Alpha medical fraternity. Dr. Johnson belonged to the Episcopal Church.

Dr. Johnson and the former Miss Myrtle Rhea Howard were married in 1912. She died in 1954 and Dr. Johnson later married the former Mrs. Susan Mead Wallace. The second Mrs. Johnson survives.

DR. GEORGE Y. SWICKARD

Dr. George Yeagley Swickard, Jr., specialist in industrial medicine, died November 22, 1958, in Orange as a result of lung cancer.

Originally from Steubenville, Ohio, Dr. Swickard was born April 10, 1906, the son of George and Ruth Swickard. Receiving his preliminary education in Steubenville and at Ohio Wesleyan University in Delaware, Ohio, he was graduated in 1931 from the Ohio State University School of Medicine at Columbus. He was an extern at Columbus State Hospital at Columbus and an intern at Lucas County Hospital at Toledo, doing postgraduate work at the Cook County Hospital at Chicago in surgery and radiology. Before establishing an obstetrics, gynecology, and surgery practice in Orange, Dr. Swickard had worked on the medical staffs of industrial plants in Caretta, W. Va.; Tulsa and Pryor, Okla.; St. Paul, Minn.; Knoxville, Tenn.; and Pasco, Wis. He had also practiced at Sunbury and at Oberlin, Ohio. During World War II, he worked as a medical supervisor with E. I. Du Pont de Nemours and Company at various locations including atomic research projects at Oak Ridge, Tenn., and at Hanford, Wash. In 1945, Dr. Swickard was transferred to the Du Pont plant in Orange.

DR. GEORGE Y. SWICKARD

A founder of the Southwestern Surgical Congress and a diplomate of the American Board of Industrial Medicine, Dr. Swickard was a member of the Texas Medical Association and the Orange County Medical Society, serving as secretary for the county society in 1942-1943. He also belonged to the American Medical Association, Phi Chi medical fraternity, American Society of Industrial Physicians and Surgeons, and Midwestern Society of Industrial Physi-

cians and Surgeons. A member of the Methodist Church, he was also a member of the Masonic Lodge and Pi Kappa Phi social fraternity.

Surviving Dr. Swickard are his wife, the former Miss Lucille Stockdale of Westerville, Ohio, whom he married in 1932; a daughter, Mrs. Charles E. Myres of Lubbock; a son, George Y. Swickard III, a student at Duke University, Durham, N. C.; his father and stepmother, Mr. and Mrs. George L. Swickard of Steubenville, Ohio; a brother, Hebert Swickard of Cleveland, Ohio; and three sisters, Miss Sara Swickard of Kalamazoo, Mich., and Mrs. Barbara Jean Travis and Mrs. Margaret Ann Horner, both of Steubenville, Ohio.

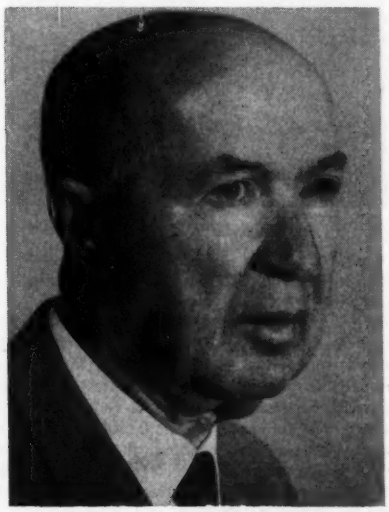
DR. J. C. LOVELESS

Dr. James Clark Loveless, Lamesa specialist in eye, ear, nose, and throat, died November 29, 1958.

The son of Mr. and Mrs. Elbert W. Loveless, he was born December 31, 1877, at Hillsboro. He attended the University of Texas School of Medicine at Galveston, where he received his doctor of medicine degree in 1906. He took postgraduate work at Tulane University College of Medicine at New Orleans and also at Chicago.

Following his graduation, Dr. Loveless practiced for a short period at Hillsboro before entering general practice in Roscoe, where he stayed until 1912. Going to Lamesa, he continued his general practice there until 1945, when he began to specialize in eye, ear, nose, and throat. Dr. Loveless was instrumental in the building of the Loveless-Bennett Hospital (now the Lamesa General Hospital) and at one time was recognized as the "Most Useful Citizen of Dawson County" for his interest and participation in various activities for the betterment of his community. For his work with the Boy Scouts, he was presented with the silver beaver award for "distinguished service to boyhood."

A member of the Dawson-Terry-Lynn-Gaines-Yoakum Counties Medical Society, he was president of that society in 1934 and secretary in 1939. At other times, he had held membership in the Hill County Medical Society, the Nolan County Medical Society, and the Ector-Midland Counties Medical Society. Dr. Loveless also belonged to the American Medical Association and held honorary membership in the Texas Medical Association. A member of Masonic Lodge, he was also a member of the First Methodist Church, where he served as a member of the board of stewards. He was a charter member of the Lamesa Rotary Club.



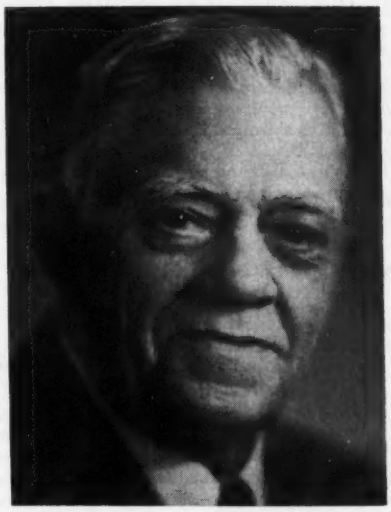
DR. J. C. LOVELESS

Dr. Loveless and the former Miss Winona Lowry were married at Mertens on September 5, 1905. She survives as do two sons, Dr. Robert Wells Loveless of Bastrop and Lowry Loveless of Irving.

DR. WALTER VAN SWERINGEN

Dr. Walter Van Sweringen, Amarillo radiologist, died November 16, 1958, of an acute coronary occlusion.

A native of Frederick, Md., Dr. Van Sweringen was born August 20, 1880. Receiving his preliminary education at Frederick Academy in Frederick, Md., he was later graduated from the University of Maryland School of Medicine and took postgraduate work in radiology there. He practiced radiology in Baltimore and Washington, D. C., before entering the United States Army Medical Corps in 1917 with the rank of major. In 1920 he established a practice at Amarillo, becoming the first radiologist to practice in the Panhandle area and there he practiced until his death. He served as chief of radiology at Northwest Texas Hospital and St. Anthony's Hospital.



DR. WALTER VAN SWERINGEN

Dr. Van Sweringen belonged to the Texas Medical Association through the Potter County Medical Society. He served as vice-president of this county medical society in 1935 and as member of its board of censors from 1937 to 1939. He also belonged to the American Medical Association, the Texas Radiological Society, and the Radiological Society of North America, and District 3 Medical Society. He was a communicant at St. Andrew's Episcopal Church and a member of the Masonic Lodge.

Members of the family who survive include his wife, the former Miss Opal Bird, a daughter, Mrs. Evelyn Stelzer of Long Beach, Calif., and a half-brother, William S. Levy of Baltimore.